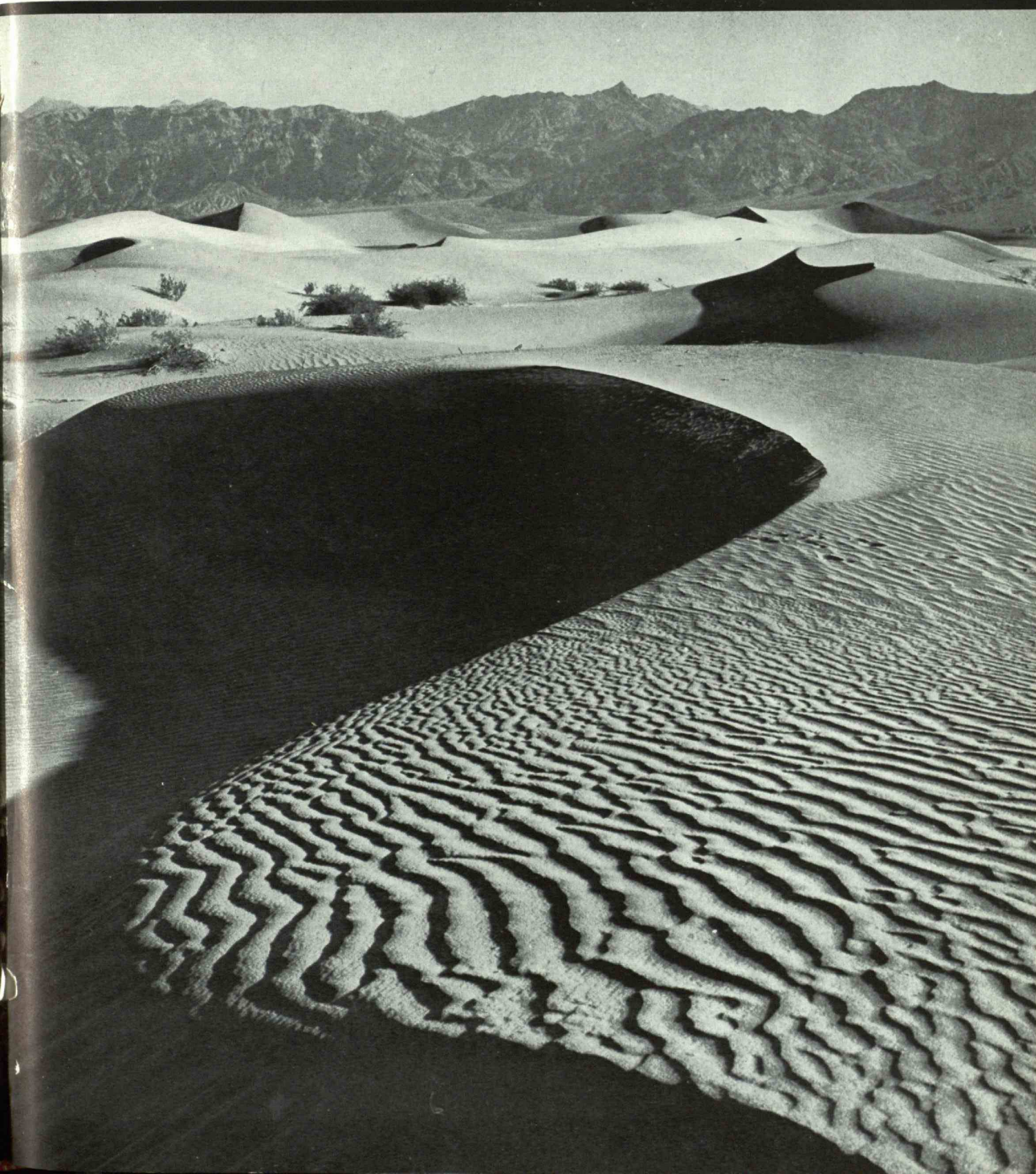


# TECHNOLOGY

REVIEW

*June* 1950



# technology review

Published by MIT

This PDF is for your personal, non-commercial use only.  
Distribution and use of this material are governed by copyright law.  
For non-personal use, or to order multiple copies please email  
[permissions@technologyreview.com](mailto:permissions@technologyreview.com).

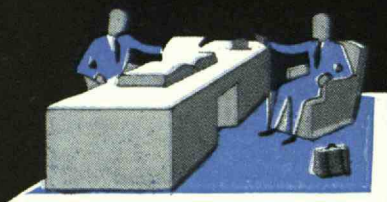




ENGINEERING



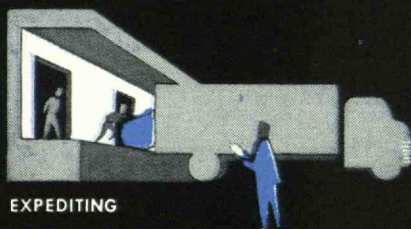
DETAILED DESIGN & DRAFTING



PURCHASING



SCHEDULING



EXPEDITING



CONSTRUCTION



INITIAL OPERATION

Economic Analyses  
 Process Design  
 Knowledge of  
 Corrosion Problems  
 Mechanical Design  
 Controls and  
 Instrumentation  
 Scheduling  
 Estimating  
 Drafting  
 Procurement  
 Inspection  
 Expediting  
 Labor Relations  
 Field Construction  
 Initial Plant Operation  
 Intimate Knowledge of  
 Latest Technical  
 Developments

FROM THE  
 MANY...

ONE



Experts in many varied fields combine to make Badger one skilled, effective, integrated organization. When you employ Badger you receive the benefits of many separate specialist services combined under a single responsibility.

Badger offers you all these skills in one organization and under one responsibility for the design, engineering and construction of any type of process plant for the petroleum, chemical and petro-chemical industries—anywhere in the world.

**E. B. BADGER & SONS CO.** • Est. 1841  
 A SUBSIDIARY OF STONE & WEBSTER, INC.  
 BOSTON 14 • NEW YORK  
 PARIS • LONDON SUBSIDIARY COMPANIES

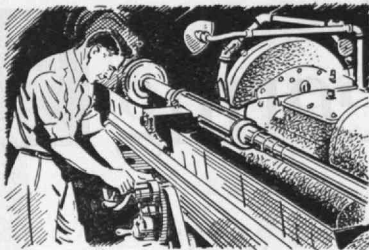
Process Engineers and Constructors for the Petroleum, Chemical and Petro-Chemical Industries



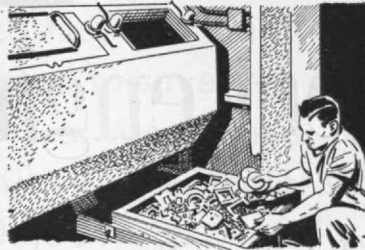
IF LES ZETTERBERG'S 12-year-old son Robert saw these giant circuit breakers in action, he'd ask questions. But he couldn't stump his father who has learned plenty during his 31 years at Norton where more than half of his associates have been in the Norton family for more than 10 years.

## "WHAT ARE THOSE FIREWORKS, DAD?"

"Powerful sparks, son, from high voltage electricity controlled by circuit breakers. And speaking of controlling electrical performance, Robert, Norton has a hand in that, too, all the way from powerhouse to our kitchen.



"MAKING GENERATOR SHAFTS TRUE with Norton grinders and grinding wheels helps get electricity off to a good start. The same quality-lifting Norton touch also improves vital parts of meters . . . big ones in factories . . . smaller ones in homes.



"FINISHING DELICATE PARTS of appliances is a quality job done by Norton tumbling abrasives. Dies and molds that form such parts are made better by Norton abrasives. Heating units of ranges, too, are more efficient because of a Norton insulating refractory.

"THOSE ARE JUST A FEW OF THE WAYS, ROBERT, by which Norton, world's largest manufacturer of abrasives, helps electrical products give better service. Countless other products, too, owe a lot to Norton."



TRADE MARK REG. U. S. PAT. OFF.

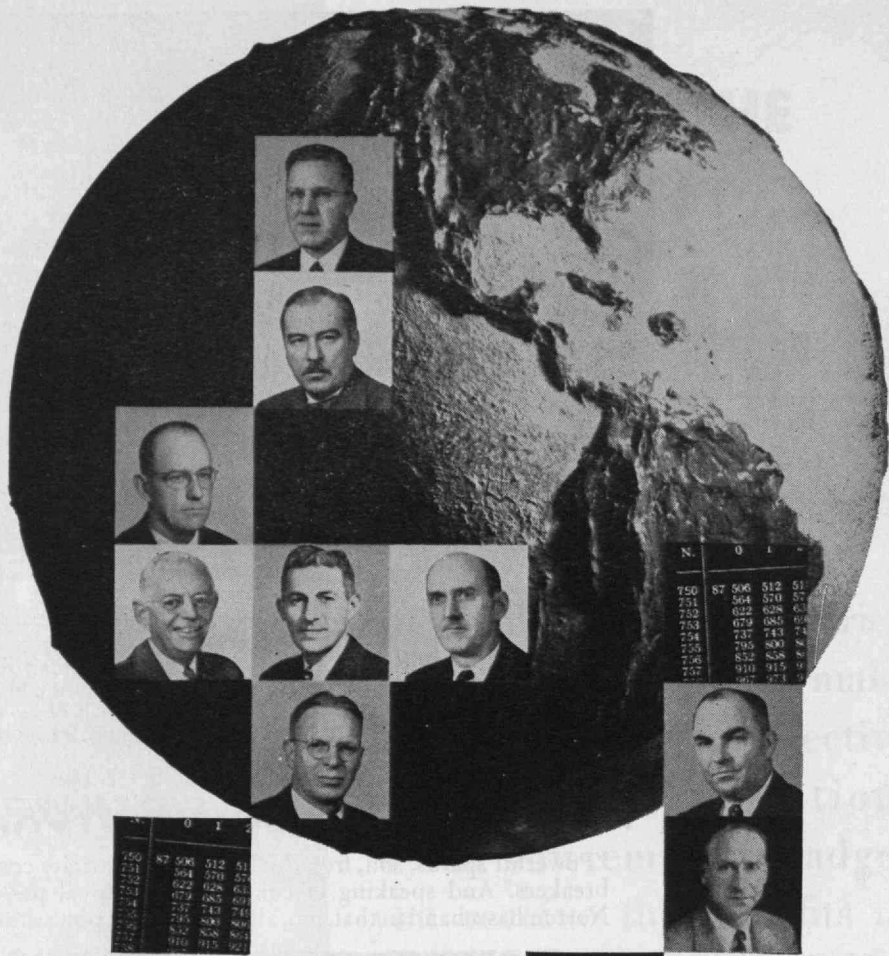
*Making better products to make other products better*



**NORTON COMPANY, WORCESTER 6, MASSACHUSETTS**

BEHR-MANNING, TROY, N. Y. IS A DIVISION OF NORTON COMPANY





# in project engineering



*look to these Lummus men for worldwide performance*

## The Lummus man

engaged in project engineering has a well diversified background of practical experience. Directly from a mechanical course at college, he entered the petroleum field and acquired his early experience with an oil company, either in the Engineering Department or in the Operating Department. He joined Lummus approximately 15 years ago, where his experience was extended covering all phases of engineering from laboratory, through design and planning to actual field construction. Keeping abreast of developments, he has maintained his standing as a licensed professional Engineer.

In his wide field of project engineering are included many of the world's outstanding refinery installations as well as petroleum chemical units.

The Lummus Project Engineer is "at home" with operations in foreign fields. He has a broad knowledge of the unique problems encountered in Europe, the Near East, India, the Orient, Latin America, and Canada, as well as in the U. S. A. Project Construction in isolated locations presents unusual difficulties in connection with problems of water supply, water disposal, housing facilities, personnel, etc., problems which the Lummus Engineer has handled successfully.

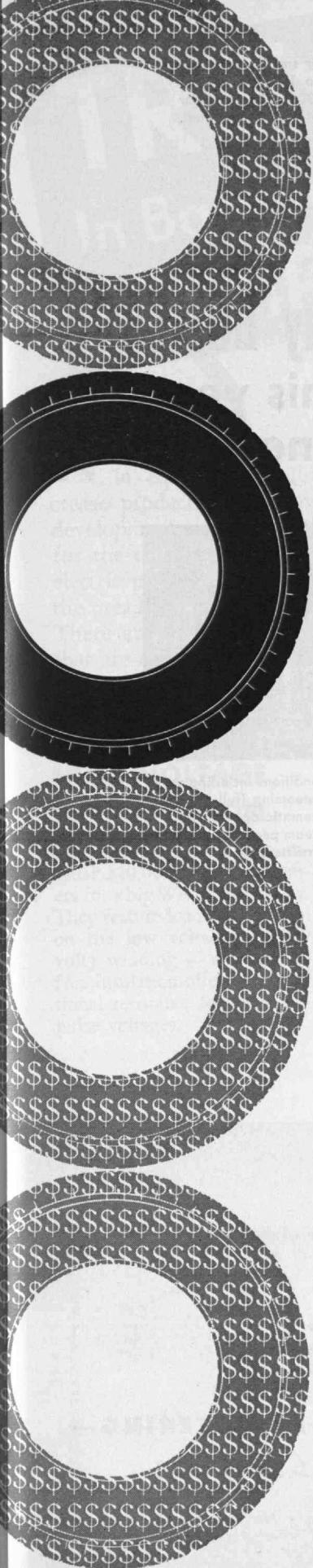
Your Project at Lummus will receive the attention of those Engineers whose experience will best fulfill your specific needs. Frequent requests by customers for reassignment of the same Engineers for "repeat" jobs is the best evidence of their competence.

**THE LUMMUS COMPANY**  
385 Madison Avenue, New York 17, N. Y.

# LUMMUS

**CHICAGO**—600 South Michigan Avenue, Chicago 5, Ill.  
**HOUSTON**—Mellie Esperson Bldg., Houston 2, Texas  
 The Lummus Company, Ltd., 525 Oxford St., London, W-1, England  
 Société Française des Techniques Lummus  
 39 Rue Cambon, Paris 1er, France  
 Compañía Anónima Venezolana Lummus—Edificio "Las Gradillas"  
 Esquina Las Gradillas, Caracas, Venezuela





## **carbon *black* saves you money**

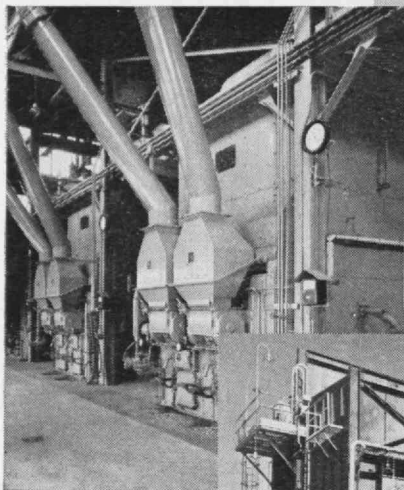
Perhaps you didn't know that there are 3 to 4 pounds or more of carbon black in every rubber tire you see. That carbon black content, costing less than 40¢, is estimated to save you the expense of 3 or 4 new tires, or saves you and all other motorists more than \$1,000,000,000 annually.

CABOT CARBON BLACKS are used everywhere to lengthen tire life and increase mileage, for their uniform quality and superior performance make rubber reinforcement dependable and complete. You'll go far with CABOT CARBON BLACK along for the ride — 3 or 4 times as far.

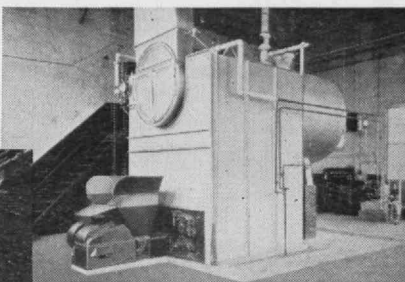
**GODFREY L.  CABOT, INC.**

77 FRANKLIN STREET  
BOSTON 10, MASSACHUSETTS

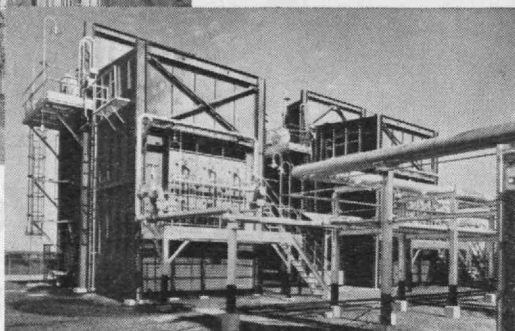




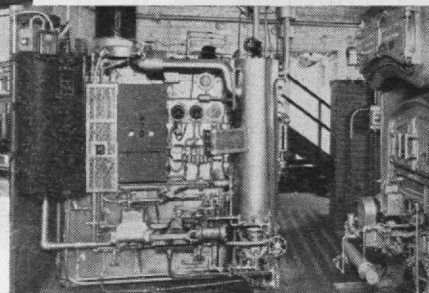
Installation for medium and smaller plants . . . pressure to 475 psi . . . capacity to 60,000 lbs. of steam per hr . . . suitable for any type of fuel.



Installation for small plants . . . pressure up to 150 psi . . . capacity to 12,000 lbs. of steam per hr . . . adaptable to any fuel.



Installation for larger plants . . . pressure to 1000 psi . . . temperature to 900 F . . . capacity to 350,000 lbs. per hr . . . any fuel or type of firing . . . indoor or outdoor type construction.



Installation for special conditions including very limited space . . . quick steaming (full capacity in 3 min.) . . . fully automatic operation . . . capacity to 6000 lbs. of steam per hr . . . pressure to 300 psi. Ideal for intermittent load.

Sometime this year, or perhaps next, your company may decide to buy new boilers . . . to replace obsolete units . . . to meet increasing steam demands . . . or for a new plant. Whatever the time or circumstances, here's something it will pay you to remember. The operating cost of a boiler is a far more important consideration than its first cost. Why? Because the *annual* cost of fuel *alone* for the average boiler installation usually equals or exceeds the purchase price. And the normal life of a boiler should be 20 to 30 years, or longer.

Obviously, then, the operating economies accruing from better design, construction or application, will quickly offset the difference between the cheapest boiler you can buy and the best the market affords. Here is one case where the old adage "the best is the cheapest" really applies.

In addition to having installed thousands of industrial boilers . . . in every size category from less than 100 horsepower up . . . Combustion has designed and built many of the country's largest utility power station boilers. And it is in this field—the manufacturing of power on a large scale—that boiler design and construction are evaluated most critically and exhaustively.

The fact that C-E Boilers have been selected to meet the exacting performance standards of so many of the nation's largest utility power stations is evidence of the quality of design and construction you can expect to find in any boiler, large or small, that bears the Combustion nameplate.

Our recommendations as to the most suitable type of boiler and firing equipment for the *specific requirements* of your next installation are available to you and your consultants without obligation.

B-383



**COMBUSTION ENGINEERING—  
SUPERHEATER, INC.**

200 Madison Avenue • New York 16, N. Y.

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT

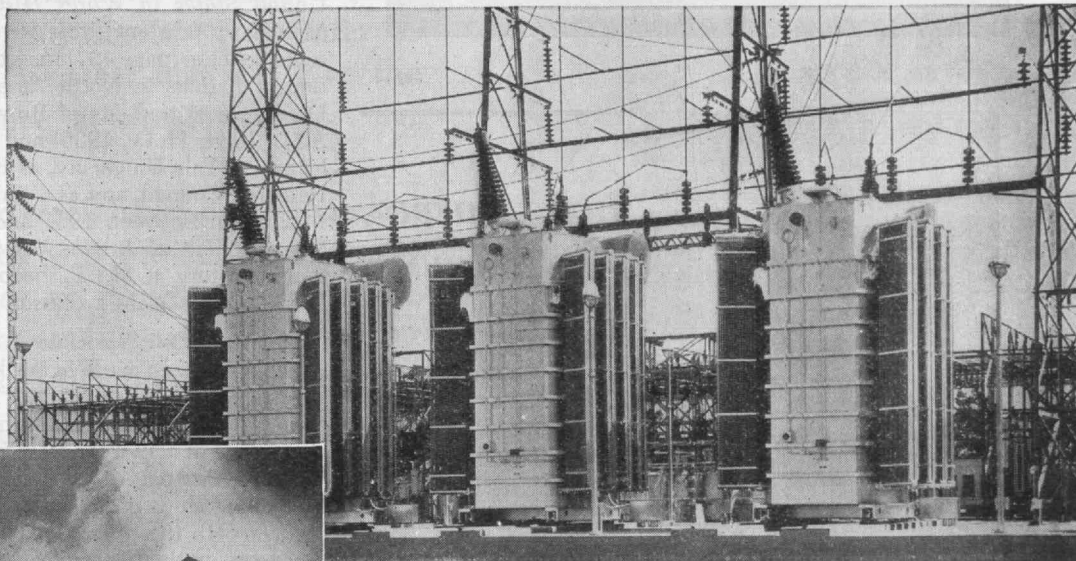
# TRENDS

## In Basic Industrial EQUIPMENT

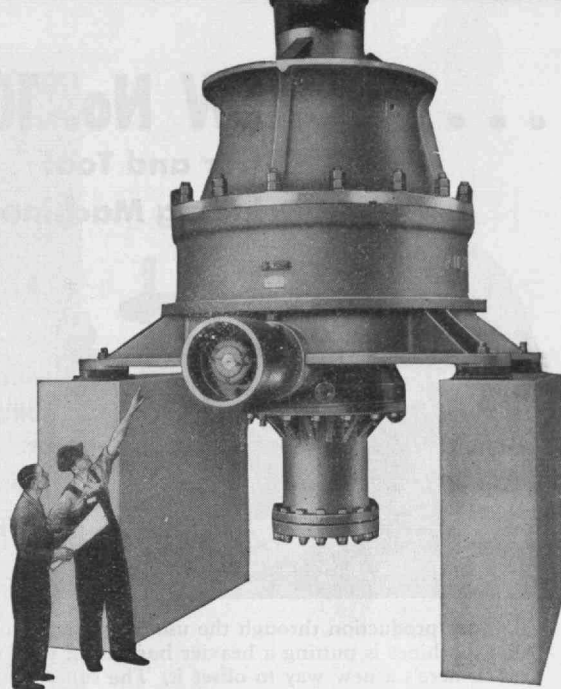
**N**EW machines, new methods and advancements in equipment engineering help industry increase production and lower costs. Here are new developments, recent installations by Allis-Chalmers for the crushing, cement and mining industries — electric power — food processing. They illustrate the breadth of this company's service to all industry. There are few products for American good living that are not processed at some point with the aid of machinery built by Allis-Chalmers.

### HIGH VOLTAGE TRANSMISSION

Allis-Chalmers built these unusual 220,000 volt transformers for a big West Coast utility. They feature load ratio control on the low voltage (72,000 volt) winding — and corona-free insulation offering exceptional resistance to severe impulse voltages.



A-3058



### LARGER CAPACITIES, BETTER CONTROL

That's what the ore and rock products industries wanted — and that's what Allis-Chalmers now gives them in the new series of *Hydrocone* fine reduction crushers. Pushbutton control of product size and automatic reset are among the features. Sizes up to 84" diameter cone and 17" feed.

### FIRST OF ITS KIND IN THE WORLD

This new continuous solvent extraction plant daily recovers 7½ tons of palatable, salable oil from rice bran. It was engineered and equipped by Allis-Chalmers for the American Rice Growers Co-operative Association of Houston, Texas. Its owners expect it to pay for itself in a few years.

WRITE for a free copy of the big illustrated ALLIS-CHALMERS ANNUAL REVIEW for 1949. Address ALLIS-CHALMERS, 786 S. 70th St., Milwaukee, Wisconsin.

*Hydrocone* is an Allis-Chalmers trademark.

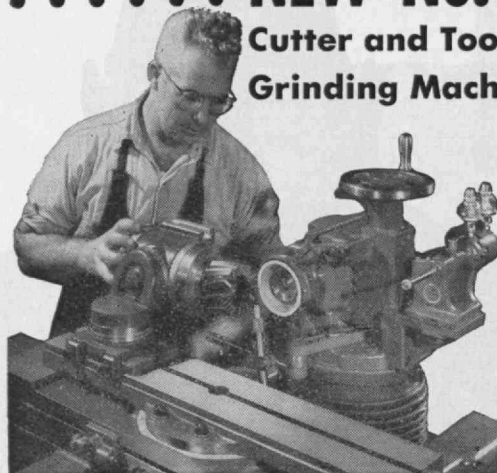
# ALLIS-CHALMERS





# ..... NEW No. 10 N

## Cutter and Tool Grinding Machine



with  
**UNIVERSAL**  
or  
**Plain**  
**Equipment**

If faster production through the use of modern production machines is putting a heavier burden on your toolroom, here's a new way to offset it. The super-versatile No. 10 N with Universal equipment is especially designed for rapid, accurate toolroom work . . . light external and internal cylindrical grinding, surface grinding, as well as routine sharpening. Also available with plain equipment. Write for illustrated bulletin. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

# BROWN & SHARPE



## RIGHT WHERE IT COUNTS

Diefendorf Gears are "right on the job"—cut to meet the exacting specifications of the customer.

Design and engineering aid  
... contract production  
... experimental development.

Gears of all types . . . all  
sizes . . . all materials . . .  
produced to individual specification only.

## DIEFENDORF GEAR CORPORATION

920 West Belden Avenue  
Syracuse 1, New York

# DIEFENDORF GEARS

## THE TABULAR VIEW

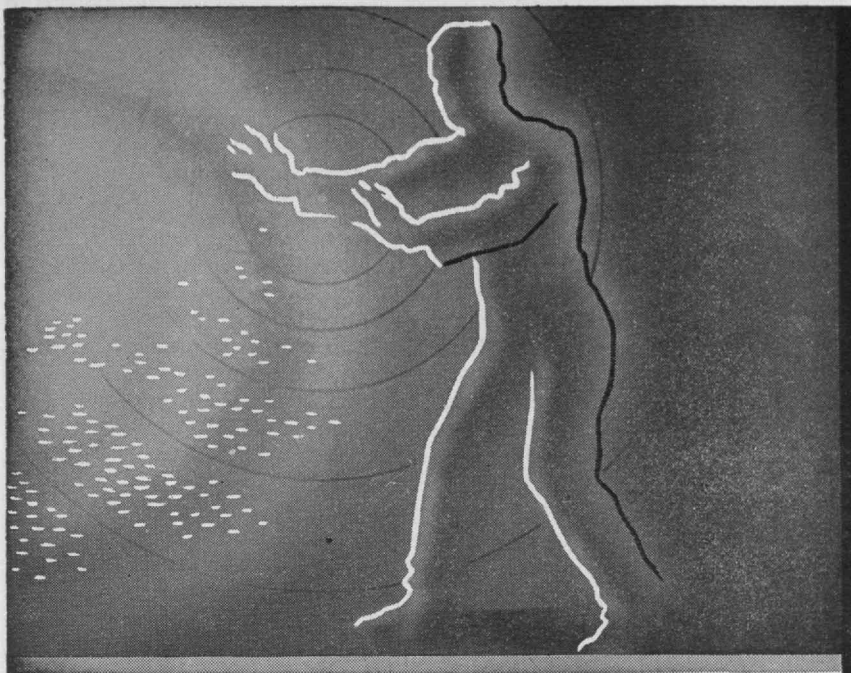
**International Bulldozing.**—In an address before The M.I.T. Club of Chicago on April 27, Technology's President, JAMES R. KILLIAN, JR., took occasion to show how the Institute's policies and activities were being influenced by that form of international bulldozing which is commonly referred to as the cold war. The Review takes pleasure in presenting (page 429) to a larger audience, Dr. Killian's statements on the new responsibilities of M.I.T. engendered by the present armed truce. President Killian has spent more than a quarter of a century at M.I.T. as student, as editor of *The Review*, as executive assistant to President Compton, and finally as successor to his former chief in holding the presidency of the Institute.

**Better Crops.**—Urging that more attention be paid to the quality—as contrasted to the quantity—of feed crops, WILLIAM A. ALBRECHT foresees (page 432) a significant improvement in the world's food supply. Dr. Albrecht (A.B., 1911; M.S., 1915; Ph.D., 1919) is a graduate of the University of Illinois and has taught soil science since 1916 at the University of Missouri, College of Agriculture, where, since 1938, he has been chairman of the Department of Soils. He is consulting editor of *Soil Science* and *Scientific Monthly*, and a member of numerous societies dealing with soil and agronomy.

**Federation of Democracies.**—JOHN B. RAE, Associate Professor of History at the Institute, and coauthor of *The United States in World History* (with Thomas H. D. Mahoney, Assistant Professor of History at M.I.T.) presents the case (page 437) for world peace through a federation of nations in North America and Western Europe. Dr. Rae is a graduate of Brown University (A.B., 1932; A.M., 1934; Ph.D., 1936) and spent a year each teaching history at Yale University, as Fellow of the Social Science Research Council, and as a staff member of the Brookings Institution. Between 1937 and 1939 he was assistant to the president of Brown University. Since 1939 he has taught history at M.I.T., becoming assistant professor in 1943, and associate professor in 1947.

**Gyroscopes for Seasickness.**—The considerable advances which have been made in our knowledge of control mechanisms, coupled with superior instrumentalities for implementing control of mechanisms, is evidently leading to a resurgence of activity in stabilizing ship roll. PAUL COHEN, '35, recounts (page 439) some past successes and failures in keeping ships on an even keel, and acquaints Review readers with the probable trend of future developments. Since his graduation from the Institute, Mr. Cohen has practiced mechanical engineering at the United Shoe Machinery Corporation and more recently at the Sperry Gyroscope Company, Inc. For more than a decade, Mr. Cohen has also found time to serve as one of *The Review's* most active editorial associates.

**Wild Life Goes to College.**—With a change only in the page number, we quote from the Tabular View for April, 1943: "Spring's coming on brings with it manifold interests for the observant. One of these is recounted for *The Review* (page 442) by CHARLES H. BLAKE, '24, Associate Professor of Zoology at the Institute, whose Thoreauvian cast of mind fits him well for the undertaking." In his current article, Dr. Blake demonstrates that keen eyes can find interesting evidence of animal wild life within the shadow of the Institute's great dome, and Henry B. Kane, '24, aptly presents pictorial testimony of flora and fauna which may be found in the Great Court.



## Blind man's buff

Blind man's buff is an expensive game to play with alloy steels. It is safer to go directly to the steel that will give the best performance at the lowest cost per finished part.

Molybdenum steels have shown time and again that they will provide consistently good properties at surprisingly low cost. Even their impact strength is consistent because they are not temper brittle.

Send for our comprehensive 400-page book, free; "MOLYBDENUM: STEELS, IRONS, ALLOYS."

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS

**Climax Molybdenum Company**  
500 Fifth Avenue • New York City

# MOLY

® C3



## MARTIN-HUBBARD CORPORATION

*Engineering Consultants*

Computers — Servomechanisms

Instrumentation for Nuclear Research

Applied ultrasonic research and development

Design and construction of scientific instruments  
to your performance specifications

Complete engineering of original or unique electrical  
and mechanical devices and machinery

Technical reports

11 BEACON STREET

BOSTON 8, MASSACHUSETTS, U. S. A.

Telephone: CApitol 7-6990

"Cable Address MARHUB-Boston

## BANKING CONNECTIONS

**W**HILE we are, of course, constantly looking for new business, it is never our intention to disturb satisfactory relations elsewhere. If, however, any change or increase in banking connections is contemplated, we would like very much to be kept in mind. We welcome opportunities to discuss banking or trust matters at any time.

### STATE STREET TRUST COMPANY

BOSTON, MASS.

*\* Main Office:*

Corner State and Congress Streets

*Union Trust Office:* 24 Federal Street

*\* Copley Square Office:* 581 Boylston Street

*\* Massachusetts Ave. Office:*

Corner Massachusetts Avenue and Boylston Street

*\* Night Depository service available*

MEMBER FEDERAL RESERVE SYSTEM

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

## MAIL RETURNS

### Satisfactory Exchange

FROM LOUIS L. COLIN, '32:

In these difficult dollar times, I managed to purloin a sawbuck to cover my contribution to the Alumni Fund for 1950-1951.

I can assure you that I look forward to each issue of The Technology Review with the greatest pleasure, not only for its information about Technology but for the very excellent informative articles which are published each month. The Review is quite definitely a publication of distinction. My sincere congratulations to the Editorial Board and their associates.

*Portuguese, East Africa*

### Omission Acknowledged

FROM ARTHUR K. HUNT, '85:

I have several times seen and admired the original of the "Gloucester Fisherman" which was reproduced as the frontispiece in the March, 1950, issue of The Review.

I think it would have been of interest if the name of the sculptor of the statue had been mentioned.

*Brookline 46, Mass.*

*[As long as communications such as that printed above arrive in The Review Office, all is well with the editors. These epistles are indicative of a careful scrutiny of the pages of this alumni publication, and when stemming from long-time readers of The Review (Mr. Hunt is secretary of the Class of 1885) could serve as a pattern for more recent and newer readers of The Review.]*

We hasten to add in this column the fact which was omitted in the March issue — that sculptor Leonard Craske created the famous statue of the "Gloucester Fisherman" which overlooks the harbor in Gloucester. The pen-and-ink drawing of the statue, printed in the March Review, was done by Sidney L. Kaye, '30, and is one of a series of well-known New England scenes by Mr. Kaye. To those who were celebrating Boston's Jubilee in May, and were not too exact in limiting Boston's environs, the "Gloucester Fisherman" probably was a worthy destination. — Ed.]



U.S. Industrial  
Chemicals, Inc.,  
Chicago

### What U. S. Industrial Chemicals said of our Service

"You are to be complimented on bringing this job to practical completion in the six months since it was started in July, particularly under the trying conditions of material shortages. We salute your organization as one that performs."

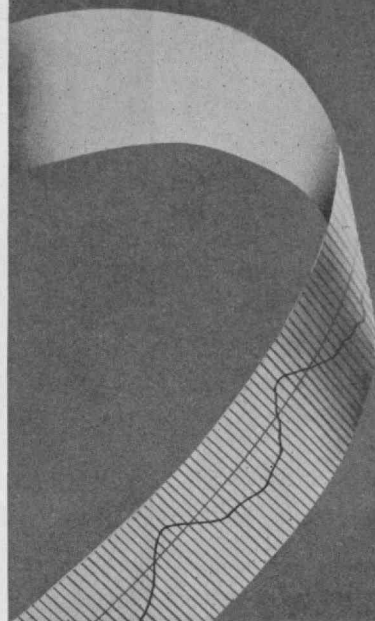
### W. J. BARNEY CORPORATION

FOUNDED 1917

101 PARK AVENUE, NEW YORK

**INDUSTRIAL CONSTRUCTION**

Alfred T. Glassett, '20 Vice President



## *Loom Research*



### **OSCILLOGRAPH RECORDER**

The oscilloscope and oscillograph are used by Draper engineers to resolve the important functions of loom mechanisms. Valuable information is gathered from instantaneous power consumption curves and stress analysis curves. The sequence of events is determined to the smallest fraction of a second. Trial and error methods are eliminated when these two important research instruments are used to explore the all-important subject of loom timing.

This is just another phase of Draper research. Our customers must be given better and better looms and mechanisms to combat the ever-narrowing margin of profit. Draper engineers are making this possible through the most intensive research.

*A Draper product is a proven product*

# DRAPER CORPORATION

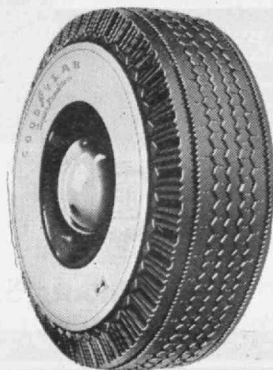
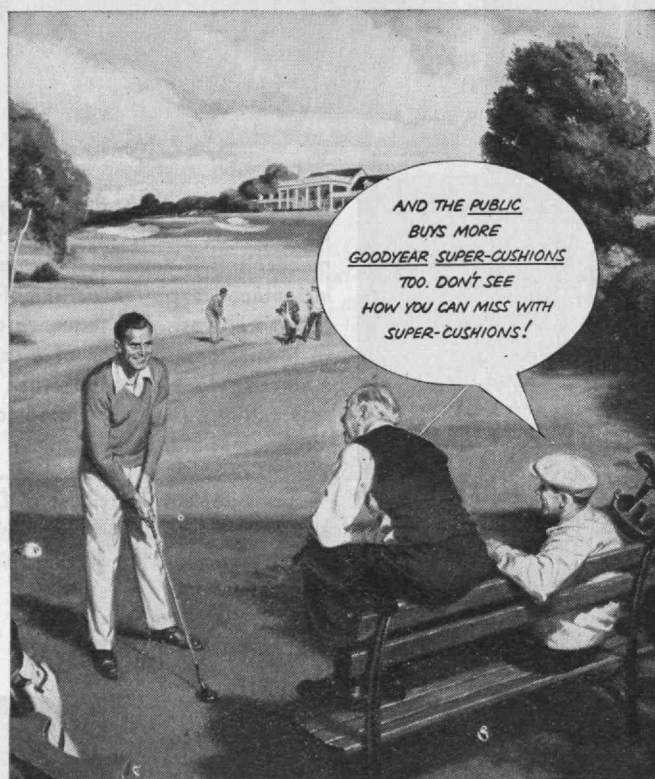
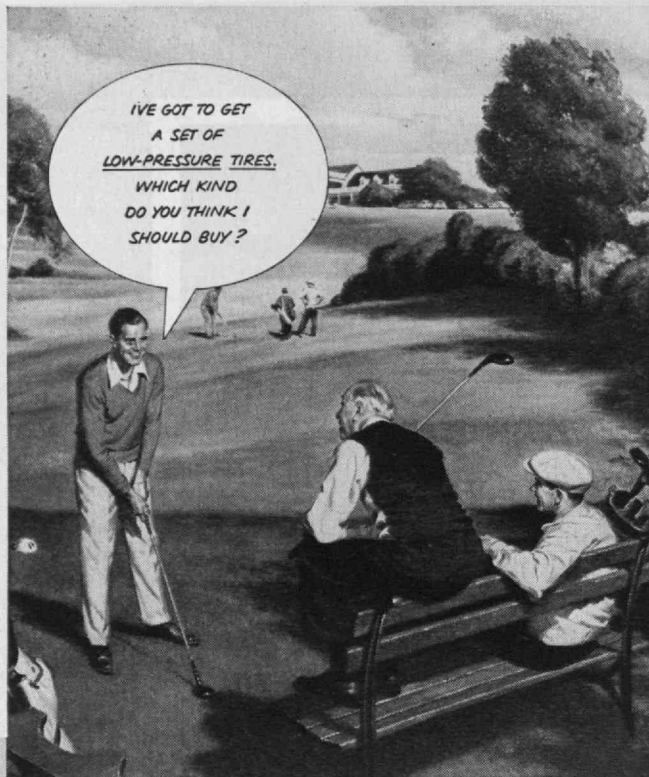


Atlanta, Ga.

Hopedale, Massachusetts

Spartanburg, S.C.



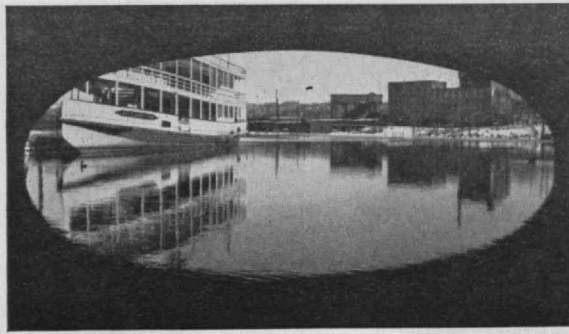


Here's why leading car makers  
 and the public prefer this great  
 tire: It gives . . .

A SOFTER RIDE!  
 A SAFER RIDE!  
 FEWER CAR REPAIRS!  
 MORE MILEAGE!

*Super*  *cushion* by  
**GOOD  YEAR**

More people ride on Goodyear Tires than on any other kind



John O. Bowman from Black Star

# THE TECHNOLOGY REVIEW

TITLE REGISTERED, U. S. PATENT OFFICE

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

## CONTENTS for June, 1950 Vol. 52, No. 8

SAND DUNES IN DEATH VALLEY • Photograph by David W. Corson  
from A. Devaney, N. Y. THE COVER

TAKE IT EASY, BROTHER • Photograph by Paul F. Ring FRONTISPIECE 424

RESPONSIBILITIES OF M.I.T. IN THE COLD WAR  
By JAMES R. KILLIAN, JR. 429  
*The twilight zone of the present armed truce raises a host of problems  
in educational administration*

QUALITY OF FOOD CROPS ACCORDING TO SOIL FERTILITY  
By WILLIAM A. ALBRECHT 432  
*Studies of forage show the need to give greater attention to the quality,  
rather than to the quantity, of crop yield*

FEDERATION FOR FREEDOM ..... By JOHN B. RAE 437  
*A federation of the world's democracies gives promise of world peace,  
coupled with individual freedom*

ROLL STABILIZATION ..... By PAUL COHEN 439  
*Improved facilities for stabilizing ship roll bring renewed interest to the  
solution of an old problem*

WILD LIFE IN THE GREAT COURT ..... By CHARLES H. BLAKE 442  
*Alert and watchful eyes can find wild life well within the shadow of the  
Institute's great dome*

THE TABULAR VIEW • Contributors and Contributions ..... 418

MAIL RETURNS • Letters from Review Readers ..... 420

THE TREND OF AFFAIRS • News of Science and Engineering ..... 425

THE INSTITUTE GAZETTE • Relating to the Massachusetts Institute of  
Technology ..... 444

Editor: B. DUDLEY

Business Manager: R. T. JOPE

Circulation Manager: D. P.  
SEVERANCE

Editorial Associates: PAUL  
COHEN; J. R. KILLIAN, JR.;  
WILLY LEY; F. W. NORDSIEK;  
J. J. ROWLANDS; D. O. WOOD-  
BURY

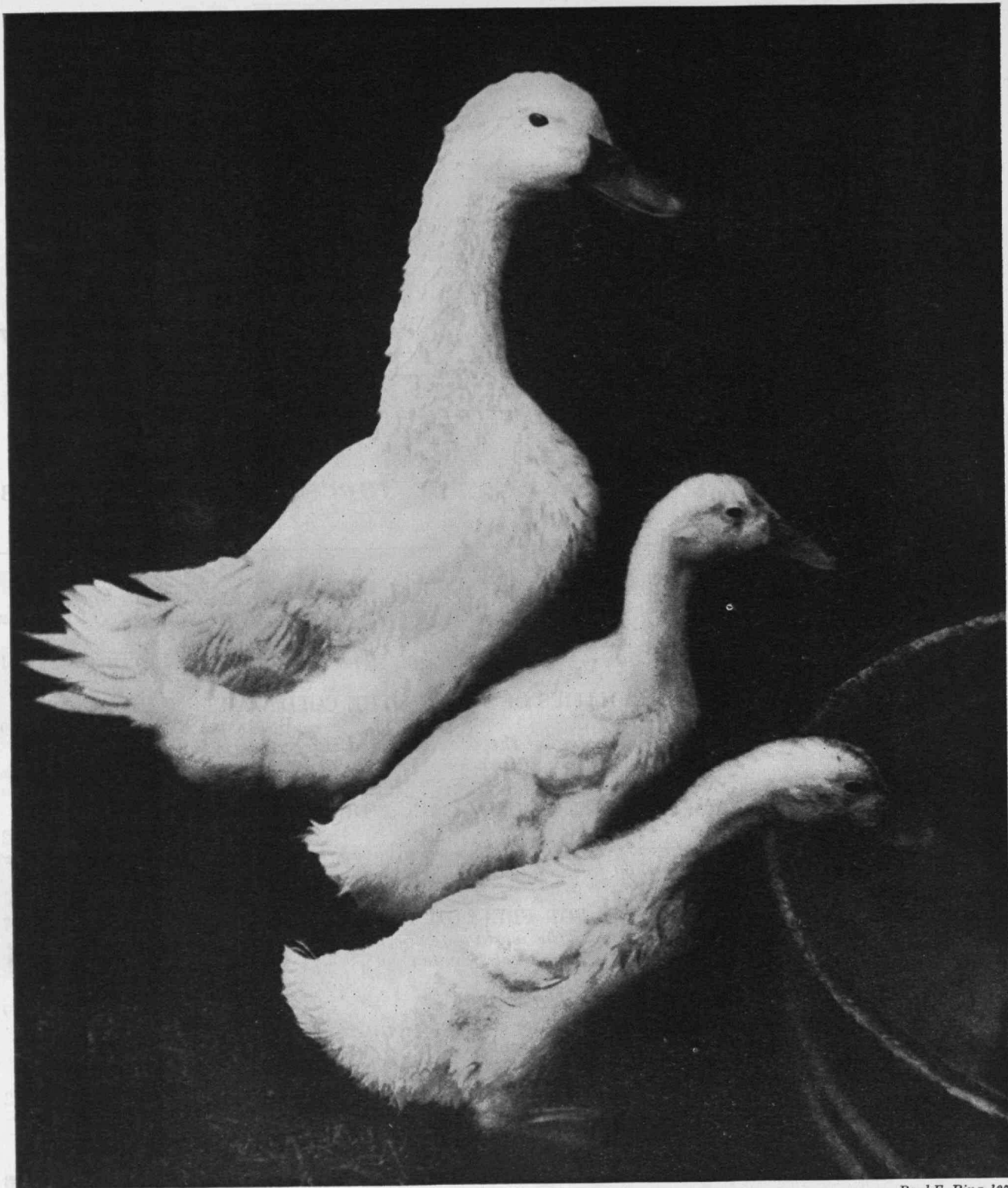
Editorial Staff: RUTH KING;  
RUTH A. PHILLIPS

Business Staff: EILEEN E.  
KLIMOWICZ; MADELINE R.  
McCORMICK

Publisher: H. E. LOBDELL

Published monthly from November to July inclusive on the twenty-seventh of the month preceding the date of issue, at 50 cents a copy. Annual subscription, \$3.50; Canadian and foreign subscription, \$4.00. Published for the Alumni Association of the M.I.T.: C. Adrian Sawyer, Jr., President; H. E. Lobdell, Executive Vice-president; Orville B. Denison, Horatio L. Bond, Vice-presidents; Donald P. Severance, Secretary-Treasurer. Published at Hildreth Press, Inc., Bristol, Conn. Editorial Office, Room 1-281, Massachusetts Institute of Technology, Cambridge 39, Mass. Entered as second-class mail matter at the Post Office at Bristol, Conn. Copyright, 1950, by the Alumni Association of the Massachusetts Institute of Technology. Three weeks must be allowed to effect change of address, for which both old and new addresses should be given.





Paul F. Ring, '27

Take it easy, brother.

# THE TECHNOLOGY REVIEW

Vol. 52, No. 8



June, 1950

## The Trend of Affairs

### *Animal, Vegetable*

ACCORDING to the familiar game, all things are classified as either animal, mineral, or vegetable. The categories, animal and vegetable, constitute, in fact, a technically sound dichotomy of all living things because (except for a few intermediate lower forms) the biologist can classify any living organism as either an animal or a plant. Animals, as a rule, are capable of spontaneous movement, show rapid motor response to stimulation, possess sensory and nervous organs, are strictly limited in size and form, do not contain cellulose or chlorophyll, and are incapable of photosynthesis. Plants in general are characterized by the converse or absence of these characteristics.

The basis of the biological sciences is an understanding of the behavior of the living cell. Fundamental studies in this field are usually carried out with one-celled organisms, which consist of a single, undifferentiated cell that is completely exposed to experimentation and study, rather than being imbedded in extensively differentiated multicellular structures, as found in the higher plants or animals. Until recently, the one-celled organisms used for basic research in cellular physiology have always been plants, simply because the bacteriological procedures for maintenance and study of pure cultures, established by Pasteur before the dawn of this century, are useful only for bacteria, yeasts, and other similar simple plants. Many forms of single-celled animals exist, but cannot be studied in pure culture by the standard bacteriological methods.

Nevertheless, discoveries in the physiology, nutrition, biochemical genetics, pathology, and related aspects of the living cell, made through use of one-celled plants, have as a rule been considered to be applicable to the animal organism.

The assumption of the basic similarity of cell function in all living things, whether they be plants or animals, is a recurrent theme in biological studies.

Research findings have never contradicted this assumption; but nevertheless, means have long been desired for making direct experimental comparisons between one-celled animals and one-celled plants. Now, thanks to recent development of techniques for maintaining pure cultures of Protozoa, which are single-celled animals, such direct comparisons are being made for the first time. The pure cultures of Protozoa have thus far been used mainly in studies of nutrition. These studies have revealed that as great or greater differences exist among the nutrient requirements of various one-celled animals, on one hand, and various one-celled plants, on the other hand, as exist between the animals as a whole and the plants as a whole.

These findings do not vitiate the usefulness for classification purposes of the distinctions between plants and animals. They do, however, confirm the validity of a standard working hypothesis of biological research; the assumption of a unity of life processes within the cell, regardless of where in the vital universe the cell occurs.

### *Hayden Library Dedicated*

As copy is being written for this issue, dedication ceremonies for the Institute's Charles Hayden Memorial Library on May 19 are a week away, but will have passed into history by the time this issue reaches its readers.

John E. Burchard, '23, Dean of Humanities, presided over a program which included: a trio for violin, violoncello, and pianoforte composed for the occasion by Bohuslav Martinu; addresses by Julian P. Boyd, Librarian of Princeton University, and Norman Cousins, Editor of the *Saturday Review of Literature*; presentation of the building by Ralph T. Walker, '11, its architect, and acceptance by Vernon D. Tate, Director of Libraries; and presentation, by President Killian, to J. Willard Hayden of a key to the library.



## For Better Rainbows

THE difficulty of producing satisfactory diffraction gratings, which form the heart of the modern spectrograph, is inherent in the small wave length of light. For example, yellow light, to which the eye is most sensitive, has a wave length of 570 millimicrons, or roughly 22-millionths of an inch. To produce satisfactory diffraction gratings for modern spectrographs, some 200,000 straight, parallel grooves must be engraved on an aluminum-coated mirror with a fine, diamond point; and such engravings must be carried out with an exceedingly high degree of precision. Even though the first and last ruled lines may be 12 inches apart, the relative positions of each and every groove with respect to any other must be correct to within half of a millionth of an inch.

The manufacture of satisfactory diffraction gratings by means of a ruling engine depends chiefly upon the construction of a machine screw of exceedingly regular lead. This screw is used to advance the diamond cutting point a small amount, at right angles to the cutting direction, after each individual line is engraved. Any appreciable irregularity in the lead of the screw threads greatly reduces the value of the finished grating. With screws threaded for as much as 20 inches, the difficulty of correcting threads to within a fraction of a millionth of an inch has set serious limitations on the production of large diffraction gratings.

In years past, Albert A. Michelson and his successors at the University of Chicago have calibrated the screw used in ruling diffraction gratings by precise measurements in terms of the wave length of light. The Michelson interferometer used for this purpose produces interference bands of monochromatic light when a mirror, actuated by the advancing screw, is moved. Each interference band which is observed represents the distance corresponding to a half wave length of light. The calibration of a 20-inch screw by photographing or visually counting the interference bands is a tedious and time-consuming process, closely akin to measuring the distance between New York and Boston with a one-foot rule. The time consumed in making a calibration may well be longer than the period during which initial measurements remain valid. Obviously, a more rapid means of making the measurements to the required precision would be a great boon in a problem of this type.

A new device, called a "commensurator," has recently been developed at M.I.T. by Professor George R. Harrison and James E. Archer, '34, a research assistant, both of the Department of Physics. This instrument automatically measures and records, to less than a millionth of an inch, the errors and irregularities in the lead of a mechanical screw. Since error curves may now be plotted automatically in a matter of a few hours instead of the long days of tedious work previously required by the visual comparison method, the development of the commensurator, in part supported by the Continental Can Company and Baird Associates, marks a significant step forward toward the completion of better ruling engines.

Fundamentally, the commensurator measures the lead of the screw in terms of the wave length of the

green light emitted by the mercury isotope,  $\text{Hg}^{198}$ , formed from gold by neutron bombardment in a uranium pile. As in the older system of measuring errors in screw threads, a Michelson interferometer is used to produce interference bands, but these are no longer counted manually. Instead, the interference bands are now detected automatically by a photoelectric system in which the frequency of the output voltage equals the rate at which the bands cross an optical slit. As many as 40 (or more) fringes each second can be used to set up an electrical wave train. The commensurator is operated in close synchronism with the turning of the screw to be calibrated, and produces an electrical comparison signal whose frequency can be adjusted mechanically to that of the fringes to within one part in 100 million. Errors in the lead of the screw then produce phase differences between the two signals, and these are recorded on a chart which indicates the compensations required. The commensurator is insensitive to transient mechanical disturbances, and produces a cam of the shape needed to correct the screw for periodic and cumulative errors.

With the new technique, successive measurements yield curves which reproduce details of displacement to within one-fifth of one millionth of an inch. The ruling engine at the Institute, an instrument begun by Michelson at the University of Chicago in 1901, and recently presented to M.I.T., has a screw which is three and one-half inches in diameter and is threaded for more than 20 inches. By means of the commensurator, measurements on this screw showed that a sag of several hundred thousandths of an inch had occurred during the war years.

It is hoped that the ruling engine using the commensurator will be completed before the end of the year, and can be used to rule gratings of very high resolving power.

## Life of Mesons

THE average heavy meson, a fundamental particle produced in high-energy atomic collisions, disintegrates about one 60-millionth of a second after it is formed, according to research results announced by three young scientists in the Laboratory for Nuclear Science and Engineering at Technology.

This calculation is the result of new pictures made at M.I.T. showing the entire life history of a meson; its entry into a test area, its decay into a smaller type of meson, and the decay of the latter into other more familiar fundamental particles.

The measurement of the average lifetime of the heavy positively charged meson, technically called the pi-meson, is considered one of unusual difficulty. The problem has been under intensive study at various laboratories throughout the country during the past two years. The meson studies announced represent the first significant research results from the 300-million-volt synchrotron completed at M.I.T. only about four months ago.

The three scientists responsible for the new work are: William L. Kraushaar and Victor P. Henri, both research associates in the Department of Physics; and J. Earl Thomas, Jr., Assistant Professor of Electrical Engineering.

## Beyond Earshot

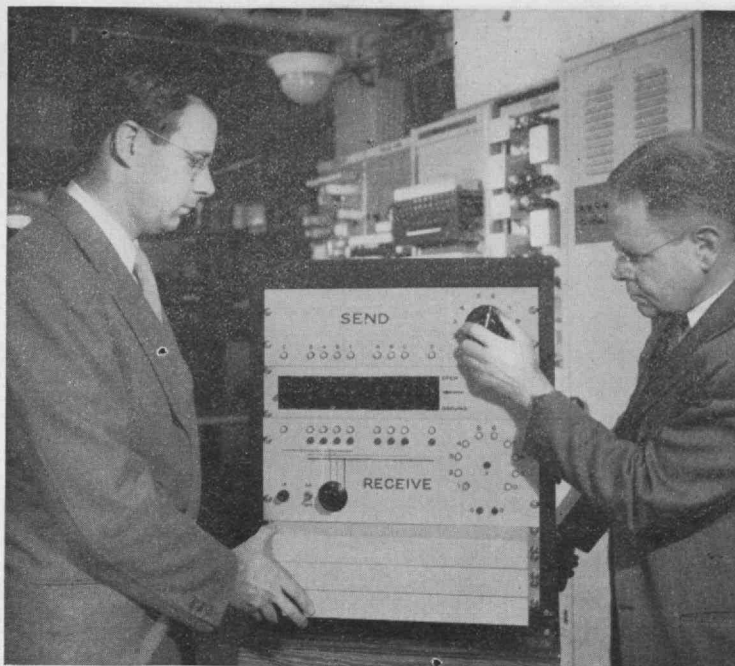
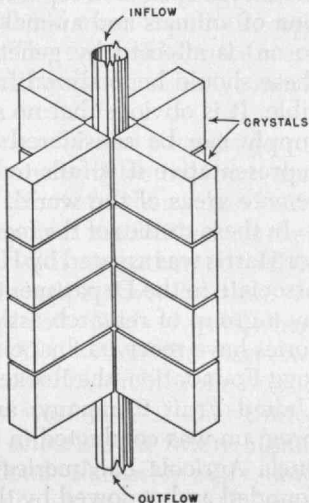
IN large measure, the lack of conclusive and consistent results obtained by workers in ultrasonics is attributable to deficiencies or limitations in techniques and measuring apparatus. In the frequency range between 20,000 and 2,000,000 cycles per second, in which most ultrasonic studies are conducted, energy is usually produced by mechanical vibrations of piezoelectric crystals which are electrically excited and, thus far, only small amounts of energy have been possible. Another difficulty is that the physical dimensions of the substance to be studied are often an appreciable part of a wave length, or even several wave lengths long; for at 100,000 cycles per second, the wave length in water is but one-third of an inch.

Even more serious, however, is the fact that most ultrasonic processing experiments have been carried out under conditions in which the applied energy produces a confused pattern of sound distribution of direct and reflected waves. Under such conditions, it is virtually impossible to ascertain whether the results of experimental work are due to the pressure or the velocity of the applied ultrasonic energy.

A program of fundamental studies, sponsored by the Office of Naval Research at the M.I.T. Acoustics Laboratory since 1947, aims to determine quantitative and reproducible data in the field of power ultrasonics in liquids. As an early step in this program, an attempt is being made to resolve the contradictory results obtained in sound fields of unknown composition by determining the behavior of biological, chemical, and physical reactions and processes as separate functions of the velocity, acceleration, and pressure of ultrasonic energy. Undoubtedly, a significant milestone in ultrasonic progress will have been reached when this goal can be fulfilled.

The first step in this method of attack was to organize a team of research workers whose diverse scientific backgrounds would aid in the design of a suitable generator of ultrasonic energy. Joseph Zallen, '39, and Dieter Goetze, '47, of the Acoustics Laboratory staff have built and tested several successful designs, in accordance with the theory conceived by Peter J. Westervelt, '47, a research assistant in the Department of Physics. The basic idea of these designs is to obtain a uniform sound field by the proper phasing of four

Ultrasonic generator made of an array of rectangular piezoelectric crystals, matched and driven so that faces adjacent to the enclosed cavity all move in the same direction (inward or outward) at the same instant of time, to produce pressure in the central cavity. The crystals can also be connected and driven to produce velocity in the central cavity.



Dr. R. W. Hamming (left) and B. D. Holbrook of the Bell Telephone Laboratories are shown with a device which endows modern computers with a new faculty — the ability to correct mistakes as well as to discover them.

piezoelectric crystals. In the small size model, four crystals of ammonium dihydrogen phosphate are arranged with radial symmetry. The inner faces of the crystals are cemented to a square, thin-walled, open-end cell. Mechanical support and electrical contact for the crystals are provided by spring-backed ball bearings. Vibrations of the crystals are thus transmitted to this cell which contains the liquid substances to be processed. In the larger sized models, four sets of crystals replace the four individual crystals, but the sound field is unchanged.

The sets of crystals are so matched and driven by a low-power oscillator that all faces adjacent to the enclosed cavity move inward at the same time and outward at the same instant of time. This operation generates a pure pressure mode of excitation in the cavity. Another mode of operation can be obtained by driving the crystals so that one pair on opposite sides of the cavity move in the same direction at any instant of time, rather than in opposite directions. This produces a sidewise motion in the cavity and subjects the material within to velocity (instead of pressure) excitation. For such operation, the crystals in the remaining banks need not be excited. Acceleration of the medium in the tube is also associated with the velocity mode of operation. Still other modes of operation are possible with this generator, all of which are accurately known. The operations are carried out at frequencies of between 30,000 and 90,000 cycles per second. The entire region containing the sample is temperature controlled, since many of the processes and reactions to be studied are temperature sensitive.

A wide range of reactions and processes can be studied quantitatively with this tool for ultrasonics.





J. H. Thomas

## The World's Foods

**S**TUDIES have been conducted by the Nutritional Biochemistry Laboratories at M.I.T. in which food plants indigenous to China, Mexico, and Central America have been surveyed for nutrient content. These studies indicate that the practical solution of the food and nutrition problem of each area of the world (especially the industrially "backward areas") should involve a better use of indigenous foods. In addition to studies which have already been conducted on the nutritional value of foods grown in Mexico, China, and Central America, investigations may soon be made of the fauna and flora of Saudi Arabia and Cuba to determine whether these countries would provide food acceptable for human consumption.

During World War II, Professor Robert S. Harris, '28, of the Department of Food Technology, in charge of the Nutritional Biochemistry Laboratories, undertook to assemble data on the composition of Chinese foods. At the time, the problem was one of considerable interest to the United States since it was believed that large numbers of military personnel might be billeted in China and be fed China-grown foods. Although the war ended before the food plants of China had been adequately sampled and analyzed, preliminary studies demonstrated that: (a) many

Chinese food plants are unknown in the United States, (b) some of the plants are exceptionally nutritious, (c) some Chinese food plants are more nutritious than similar varieties grown in the United States, and (d) rations based on Chinese foods cannot be planned intelligently without data on Chinese food plants.

In developing its federal school luncheon program, the National Institute of Nutrition of Mexico requested the assistance of Technology's laboratories. In order that nutritionally balanced, low-cost menus could be planned, data on the composition of Mexican foods were needed. It was soon learned that very little was known about the composition of these foods, and a preliminary study was conducted on samples sent to M.I.T. Later a laboratory was established in Mexico City to continue the work of Technology laboratories in overcoming this lack of knowledge. The study indicated that the foodstuffs which most effectively and economically assure good nutrition in the United States are not necessarily those which can best nourish people elsewhere. The exact analysis of all edible plants for important nutrients is basic to the sound food and nutrition program of any country.

The edible plants in each area of the world are different and, as a result, the food patterns of the people of the world are different. Moreover, civilian populations prefer to continue on their native diets and may be very well fed upon "un-American foods." It is desirable, therefore, that each country should be helped toward a proper use of its own food resources, and an analysis of native foods should be the first step in a study of the food potentialities of any area. One cannot make the most of the food resources of an area without data on the composition of the food plants indigenous to that area.

An analysis of the edible flora of the Mesquital Valley of Mexico was conducted in collaboration with the Rockefeller Foundation which surveyed diets of the Otomi Indians in this desert valley. Out of the collaboration has come the startling observation that the diet of the Otomi Indians contains more than 70 per cent of the recommended dietary allowance of all nutrients except riboflavin. The Otomi Indian diet was slightly low only in calcium, riboflavin, and niacin.

Since environment and especially genetic differences produce variations in the composition of edible plants, it seems necessary that these plants be sampled from each area separately. Because the composition of animals and animal products (milk, eggs, and so on) is affected by genetic differences, samples of these should be analyzed from as many areas as possible. It is obvious that no survey of the world's food supply can be considered to be accurate and truly representative if it fails to take account of the more remote areas of the world.

In these studies of the foods of other nations, Professor Harris was assisted by Hazel E. Munsell, a research associate in the Department of Food Technology, and by a group of research assistants. The M.I.T. laboratories have received financial assistance from the Kellogg Foundation, the Rockefeller Foundation, and the United Fruit Company; and the Central American program was conducted in collaboration with the Escuela Agrícola Panamericana, an agricultural school founded and endowed by the United Fruit Company.

# Responsibilities of M.I.T.

## IN THE COLD WAR

BY JAMES R. KILLIAN, JR.

*In an address before The M.I.T. Club of Chicago, on April 27, President Killian reported on recent developments and accomplishments at the Institute, much of which appears, or will be reported, in The Review. But President Killian also spoke on "some of the broader matters of concern to the Administration," and the present article contains that portion of his address which deals with the Institute's "new responsibilities engendered by the present armed truce." — Ed.*

THE cold-war situation, in which this nation now finds itself, is in many ways more complex than either total war or total peace. It is a situation which places new responsibilities on colleges and universities, none more important than that of resisting the imposition of restrictions on the free exchange and communication of information. And because present cold-war restrictions have gone the furthest in scientific research and development work, I believe that M.I.T. has a special responsibility here to make its voice heard.

Today, both within and without our universities, scientific advances are being retarded by too much secrecy. In the public mind secrecy is mistakenly considered synonymous with security; actually secrecy and scientific progress are mutually inimical. I am not one of those who believes we should have no secrets — that is obviously absurd in a period of cold war. I do believe that we can achieve a better balance between secrecy and free exchange of information for the purpose of accelerating our scientific advance. If there were fewer secrets in our atomic energy program, for example, we could forge ahead more rapidly in engineering for atomic energy. There would be more cross-fertilization, more mutual stimulation of active minds that are new to the field.

Unreasonable restrictions may also discourage scientists from working in the very fields in which they are most needed. The scientists themselves have warned that this will happen if restrictions on their freedom of communication with each other, or on their personal lives, become too oppressive. Nor can we hope to attract young people into fields of work where such restrictions prevail. Yet within the past two months Sumner T. Pike, acting chairman of the Atomic Energy Commission, has warned that the United States faces a shortage of scientists for future atomic work, and spoke of the Federal scholarship and fellowship program by which it is hoped to increase the num-

ber of men in training for all kinds of nuclear research.

Loose thinking about the danger of someone "handing over secrets" to the Russians is an oversimplification which can blind us to the fact that the great secret of our scientific and technological strength — the strength of the United States today — lies in its corps of exceptionally well-trained scientists and engineers. We should make every effort to strengthen morals and interest among those who are working in the nuclear energy field. The atomic explosion in Russia indicates that they, too, have trained men and topflight scientists. Traitorous leakage of secret information on the United States atomic energy program could not have resulted in this development unless Russia had the skilled scientists to put these stolen secrets to work.

The question of what regulations and restrictions are legitimate and wise, raises further questions of public interest. As a citizen I cannot but feel that more open discussion is needed of the policies involved in our atomic energy program. Here again we are not only up against the hard necessity of protecting legitimate military secrets, but of trying at the same time to give the public the maximum opportunity to debate and appraise policies and decisions which affect the national welfare and which involve moral considerations that are best resolved by the open procedures of democracy.

The recent decision by the administration, to move full steam ahead on the development of the hydrogen bomb, is a case in point. Let me make it very clear that I myself am convinced that we should seek to develop the hydrogen bomb. With a potential enemy nation presumably carrying on work along the same line, it would seem to me to be unwise for us to hesitate at this time to proceed in this direction.

I do feel, however, that there should be more public discussion of the atomic weapons program. There are many phases of our national program, not least of which is the defense budget, on which public opinion will have a decisive influence. And a public which does not receive correct and adequate information will act on the basis of emotion and misunderstanding. I am pleased, therefore, to note that in articles by Hanson W. Baldwin and in a series in the *Scientific American*, there is currently being presented to the public a clearer picture of the meaning of the hydrogen bomb decision than it was able to get through the speculation and gossip which preceded and accompanied the announcement of President Truman about this program. Recent speeches and articles by such physicists as Robert F. Bacher (until recently a member of the Atomic Energy Commission), Hans A. Bethe, and



Louis N. Ridenour are helping to clarify the layman's picture of the prospective hydrogen bomb, and to provide him with a better conception of its possibilities and its limitations.

These restrained and thoughtful discussions on the part of informed scientists are timely antidotes to ill-informed and reckless speculation, and call attention to several important matters. These speakers and writers stress the fact that even if we were able to develop such a bomb, there is a real question as to the extent to which this would improve our military position.

Robert F. Bacher, for one, does not believe that our military position would be improved by very much. He estimates that one hydrogen bomb would probably not be much more effective than 10 atomic bombs, and said in his speech in Los Angeles on March 27 that "if any nation has as many as a thousand atomic bombs . . . the world is already in the position where any nation could be blasted thoroughly and completely insofar as bombing alone can be effective." But the United States public does not know how many atomic bombs we now have. It would seem that here is a matter that needs further public discussion: the pros and cons of releasing this information.

One thing we do know, and that is that even if the Russians had not yet embarked on a hydrogen bomb development program, the announcement that the United States is going ahead on such a program is almost certainly going to insure their following suit. And it is also evident to anyone who thinks about it at all, that a weapon whose only advantage is that it can destroy a larger area than can be destroyed by an atomic bomb, is a weapon which could probably be more useful for the Russians than for us. In the United States there are many more large concentrations of industry than in Russia. Moreover, many of our industrial centers are on the seaboard, in contrast to Russian developments which are mainly inland. This in turn gives any enemy of the United States alternative ways of delivering a hydrogen bomb which are not open to enemies of the Soviet Union who would presumably have to rely on air delivery.

Bacher, in his speech in Los Angeles, also has this to say of the hydrogen bomb: "While it is a terrible weapon, its military effectiveness seems to have been grossly overrated in the mind of the layman. What is probably much more serious about the hush hush subject of the hydrogen bomb is that here is a weapon about which the average citizen is so ill-informed that he thinks it can save the country from attack." And Bacher concludes: "The most tragic part is that the hydrogen bomb won't save us and it isn't even a very good addition to our military potential."

Without informed discussion of this sort by physicists, the lay public could easily be lulled into a feeling of false security. Such a public would be very poorly prepared, to say the least, for making useful and intelligent decisions on such matters as a defense budget, or the importance to be given to international economic programs designed to strengthen friendly nations.

There must be more adequate information on the whole atomic weapons program if the layman is to

take an intelligent interest in the allocation of our military budget as between the different services. The hydrogen bomb is obviously not a weapon of much usefulness against armies which have invaded countries it might be our wish to save. Nor would it seem to hold out much hope as a useful antisubmarine weapon! But these are questions which must enter into any discussion of our preparedness program.

Recently 11 Faculty members of M.I.T. and Harvard have raised important questions in respect to the present military planning of the United States. This group, which includes Duncan S. Ballantine, Assistant Professor of History, Martin Deutsch, '37, Associate Professor of Physics, William R. Hawthorne, '39, George Westinghouse Professor of Mechanical Engineering, Jerome B. Wiesner, Associate Professor of Electrical Engineering, and Professor Jerrold R. Zacharias of the Department of Physics at M.I.T., has suggested that: "major reliance on strategic bombing and atomic weapons leaves the United States without an effective deterrent to limited aggression." These men have also pointed to the misconceptions of American motives which may arise from our great emphasis on weapons for the mass destruction of human life. They believe, too, that extensive reliance on the bomb by the United States, is putting us in a position where it will be difficult for this country to accept agreements restricting the use of atomic weapons.\* Here are fundamental questions which all of us should think about and discuss.

The public must also take an informed interest in the manner in which decisions of such momentous import as those on defense allocations are being made. Only a few days before the Truman announcement of the hydrogen bomb program, President Conant of Harvard said to a Rochester, N.Y. audience: "The simple fact is that many important decisions are made in Washington today without adequate evaluation. . . . To my mind we have not yet evolved a satisfactory procedure for evaluating differences of opinion among technical experts." Dr. Conant called for a reorganization of procedures which would include civilian review of disputes among scientists on matters of defense. This and other suggestions for a review of top-level decision-making procedures should be thoroughly explored.

Less obvious, perhaps, but of crucial importance, is the need for public understanding of the importance of basic research to our security program. There must be continuing review of the extent to which our limited scientific personnel and defense funds should be assigned to the development of new weapons at the expense of basic research. Here is a question on which the colleges and universities can speak with some firmness. There has been wide agreement among civilian scientists and educators that if we, as a nation, are to remain strong, programs for basic research must continue alongside programs in applied science.

We in the scientific institutions are under constant temptation to divert our scientists and engineers away

\* These recommendations were made public through a letter signed by the members of the group in the *New York Times*, April 30, 1950.

from fundamental research by turning their interest too much to what might be called applied or development activities. If allowed to happen on a large scale, this could dry up the wellspring of new knowledge with ultimate disaster to our national security.

Forced as the country is into a vast armament program, the public could very easily conclude that the most important thing is the immediate development of equipment and the solution of military problems, and that we should concentrate on short- rather than long-range objectives. Fortunately the defense establishment, and in particular, the Office of Naval Research, is aware of the importance of fundamental and basic research and has given substantial support to work of this kind. But it is imperative that the public realize that it is fundamental scientific research which makes new developments possible, so that it will support legislative and administrative programs to this end. If ever we are forced or deluded into a peacetime policy in this country of diverting our scientific personnel to short-term objectives alone, we may well be cutting the taproot of our future security as well as our industrial advance.

Our universities, too, have a responsibility not to permit themselves to become hamstrung by secret activities. When they must deal with secrets, they should segregate them so that their main activities continue in the clear daylight which is the only condition in which true learning can flourish. For the same reason they must resist such incidental effects of secrecy as the provision that Federal fellowships be given only to students who have been subject to clearance by the Federal Bureau of Investigation, except in cases where the student is to be working directly on secret programs. Such restrictions are inimical to the spirit of learning; our universities should be communities where suspicion has no place.

My point is not to discuss the pros and cons of the country's preparedness program, but to throw out the suggestions that we need to have much more general discussion of these programs than we now have. We must demand the maximum of open discussion which reasonable men would adjudge not to endanger our security. I am heartily in accord with the recent recommendation of the Committee for Economic Development. This businessmen's research organization has, through one of its committees, suggested that there should be a duly appointed representative of the public charged with the duty of advising the President when secrecy in government becomes excessive and dangerous to the public interest.

I believe that colleges and universities must not only stand firm against all restrictions on freedom of speech

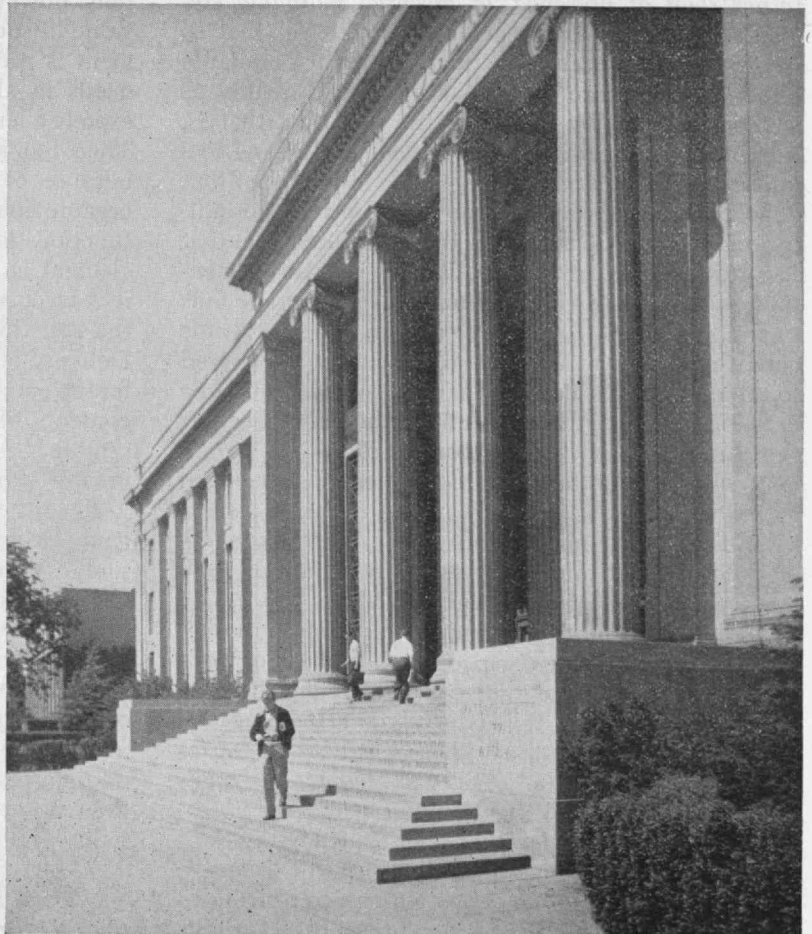
and information not clearly called for by security needs, but must also serve as radiating bodies for the critical examination and discussion of the issues before the nation. In a political democracy, freedom from restrictions on speech is not enough. Access to information is also important. Colleges and universities must play an active and aggressive role in seeing to it that people are well informed on the questions of the day.

Colleges and universities can help the adult population of the nation learn about the possibilities which unfold with each new scientific discovery or technical advance. Everyone must become aware of how these advances affect the current scene, for they are part and parcel of the political problems now before our democracy. If the people of this country are not well informed, they will lose control of great new forces for good or evil, and so forfeit the very freedom of decision which characterizes democracy as we know it.

It has seemed to me to be a very heartening sign of strength in our democracy that recent years have seen the scientists themselves take so much responsibility for educating the public on the advances in science which are revolutionizing the world in which we live. I have mentioned the recent discussions of the atomic weapons programs by Bacher of the California Institute of Technology, Ridenour of the University of Illinois, Bethe of Cornell, and Zacharias and others of M.I.T. There is hardly a topflight physicist

*(Continued on page 448)*

*M.I.T. Photo*





# Quality of Food Crops

## ACCORDING TO SOIL FERTILITY

*The Quality of Our Products Is at Least as Important as Quantity*

BY WILLIAM A. ALBRECHT

GENERALLY speaking, it has come to be a well-established fact that forage feed crops of higher nutritional quality demand that the soil deliver into them a larger variety and a greater quantity of inorganic nutrient elements. Reciprocally, we know that there is also a greater exclusion of silica, for example, and also of some of the other elements which are not yet considered essential for plants and animals. Seemingly, it is on the partial basis of these generally known facts that a higher concentration of almost any one inorganic nutrient element, in the dry matter of it as forage, has come to be erroneously considered as proof of better quality of feed. Therefore, high ash contents have held undue prominence in some minds, through the belief in them as proof of quality. High contents of so-called minerals in the forage have been taken all too commonly as indicative of high quality in terms of animal nutrition.

*Ash analyses are suggestive by detection of absence, rather than of presence, of essential inorganic elements.* Reasoning by means of the positive (that is, "more minerals mean more quality") is not as reliable a mental procedure in estimation of feed quality as is the reasoning by means of the negative (that is, "absence of certain inorganic elements means less quality"). This latter reasoning holds to the belief that deficiency and absence are much more reliable indications of low quality, rather than the conviction that the presence of certain quantities of inorganic essentials is an indication of high quality. If the forage fails to contain cobalt, for example, there is no inorganic cobalt delivered to the animal. Nor is any delivered to the microbes in its intestinal tract by the synthetic activities of which this inorganic element may become the important newly discovered vitamin B-12. An analysis of ash for the inorganic elements can be taken as index for quality, mainly in the negative aspect, by indicating the absence of quality. Just how much of each element must be present to guarantee high quality is still an unknown fact.

The presence of an inorganic element in increasing amounts, or its positive aspect in the ash, is of little specific value in proving increasing or higher quality. Its presence merely extends the possibility that it may have served in the plant in those synthetic activities that contribute to higher quality of feed. On the other hand, an inorganic element (such as silica, alumina, barium, and other elements coming from the soil) may have merely been "hitchhiking" into the forage — sometimes in large amounts, without appearing to be essential for any plant functions or the synthesis

of any compounds representing food quality. It may have been accumulating because of the shortage of some other essential by which it would have been transformed, or diluted through more plant growth or increase of carbohydrates and plant bulk. An element present in the ash is no proof of physiological performance in the plant's life processes. For physiological service there must come into consideration the integration of the activities of the element in question with those of all the other elements as synthesizers of essential food compounds. Even if they should be correlated with the fertility levels in the soil, such complex activities surely can neither be measured nor specified by an examination that is no more critical than inorganic analyses for the ash contents alone.

One can demonstrate readily that the concentration of a single element (such as potassium) in the forage depends upon the degree to which the clay of the soil is saturated by that element, or the amount of the element on the colloidal clay complex in the soil. This fails, however, to be evidence for higher nutritional value of such forage as feed when the potassium element is present in excess of the animal's nutritional needs in all vegetation. Both animals and humans excrete a large share of potassium ingested in the food. Then, too, its function in plant physiology is unknown because of its failure to be present in any known organic food compounds; and our ignorance of its functions in our body is serious. Within the plant this element is highly water soluble and mobile. In fact, it is leached out of a crop by rain and put back into the soil toward crop maturity even before harvest. Delivery of larger concentrations of potassium in the forage can be shown to be correlated with the higher contents of potassium in the soil, but this fails to establish a higher nutritional value because of the greater concentration in the feed of this "potash."

Nevertheless, the soil is the source of all the inorganic essentials for growth of all life. It is also the source of elements that may not be essential but merely "accompany" others going into the plant. The plant is the means by which elements in the soil serve the nutritional needs of the plant itself. By synthesizing organic compounds, the plant also is the means of making the elements serve the nutritional requirements of animals, and finally for man. In speaking of deriving essential inorganic elements from the soil, then, we are dealing with something more than essentiality for plant growth.

*The indirect services of the soil are no less significant than its direct services.* Because a change in pasture



flora occurs with declining soil fertility, the indirect effect of soil fertility on feed quality often goes unrecognized. Whether the effects and influences of inorganic elements from the soil are direct or indirect, in determining the quality of feed, is not the question. If the supply of fertility elements is too low for the soil microbes, and a diminished crop of lowered quality occurs, such results (commonly attributed to the microbe) do not negate the truth of the statement that the quality of the crop above the soil depends on the fertility of that soil. Occasionally it happens that the declining fertility of the soil causes a weed crop, like broom sedge, to take over the pasture where formerly some forage of higher quality, such as bluegrass, prevailed. One might say that the poor forage quality was the result of the introduction of the seed of this weed, or that the broom sedge "took the pasture." But here again we have a forage of higher quality starved out and one of poorer quality surviving to give much bulk because the lower fertility of the soil prohibited the survival of the better one.

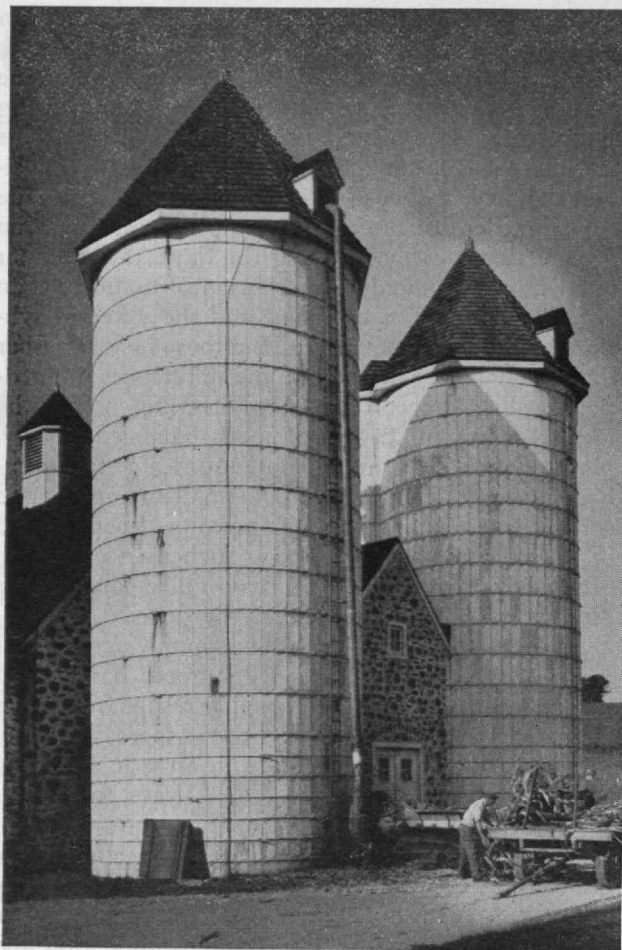
Are we not merely failing to carry the thinking one step further toward the fundamental cause when we say that the change in its flora is the cause of the poorer pasture? Can't we recognize the soil as the creative support of any crop and say that the lowered fertility of the soil starved out the protein-producing grass but permitted the wood-making sedge to flourish? Isn't it time to realize that changes in the nutrients, which the soil feeds to the plants, are the cause of the changes in the flora? Changing the flora artificially by our search for, and introduction of, new species — completely disregarding the soil fertility in relation to their qualities as feeds — has already too long been a national research pastime to bring in more crops of greater bulk but of less nutritional values.

Then, often it is said that there are differences in the degree of maturity of the crop when it is harvested, and hence there are differences in the quality of the crop as feed. When we have measured the growing season so habitually by days, it is difficult to conceive of differences in quality due to differences in physiological age, rather than in age according to the calendar. Because it requires a simple mental effort no greater than merely counting the days, the calendar is far more commonly the criterion of maturity than is the physiology of the plant and the different synthetic performances within it. But these factors, rather than the calendar, determine the differences in nutritional values in accordance with the differences in the fertility of the soil. In soils of poorly balanced fertility, plants mature early, and do not require a certain number of calendar days to attain the small amount of food constituents such little fertility permits. When planted in soil of unbalanced fertility, such as occurs with excess of nitrogen, the plant may fail to complete its growth cycle and maturity may be delayed.

An increase in plant mass is commonly accepted as proof of increase in its quality as feed. If we grant that an improvement in feed quality results from those factors of the soil associated with the increase of protein concentration, then we are in error in believing that increased quantity of crop always means increased quality. The very reverse may be true. Concentration of protein and total tonnage of bulk are not causally connected. They may vary either directly or inversely. Less bulk may mean more quality. More bulk may mean less quality. Protein production and its accumulation in the plant are not the direct result of photosynthesis, or of the process which amasses the vegetative quantity. Sugar production and starch accumulation are. Therefore, more quantity of crop

*H. Armstrong Roberts*





William M. Rittase

may only mean more sugar and more starch, at least in total, if not in concentration. More crops such as these may well indicate additional fuel or energy foods of less-balanced nutritional value. These foods would require that more protein be added from other sources to supplement the animal's ration. Such has been the case with increased yields of hybrid corn. But with plenty of fertility and with that in balance, it is possible to have both a larger tonnage of bulk and also a higher quality as feed within it.

*Soil fertility makes the difference between vegetative bulk with lower or higher nutritional values.* Protein production by the plant still requires sugar production by photosynthesis as a precursor. But in terms of soil fertility it also requires the delivery of a great deal more than is demanded for rapidly multiplying the bulk of sugar, starch, cellulose, and other forms of carbohydrates. Protein production within the crop requires many essential elements and processes in addition to the advance photosynthetic operation of sugar production. The conversion of sugar into protein is a biosynthetic process, occurring at night as well as in day, in which much of the sugar is burned and combined with nitrogen, phosphorus, and sulfur. Of necessity, such a process brings about a reduction of the carbohydrate bulk through respiration. Consequently, the proteins, which are so prominent in giving high quality to feeds as nutrition for higher animals, are built up slowly.

Accordingly, then, we can have a crop producing

bulk, either rapidly — as a carbonaceous product — or much less rapidly — as a proteinaceous one. This was demonstrated for the former with the absence, and for the latter with the presence, of inoculation of the soybean crop as the only difference in the experiment under the same accurate controls of the plant nutrition by means of the colloidal clay technique. The carbonaceous soybeans without nodulation, and behaving physiologically as a nonlegume, yielded an increase in bulk, or in hay yield, of approximately 50 per cent over that of a similar crop with nodulation from the same seed, behaving physiologically as a legume and raised on the same soil. At the same time, the crop of lesser bulk was delivering 32 per cent more total protein. A higher concentration of the ash elements or fertility (but not necessarily more total) was likewise found in the smaller crop; a requisite for its service in protein synthesis.

Our criterion of crop quality must consider the physiology of the plant which, in turn, depends on the fertility of the soil. The vegetative bulk delivered, and the pedigrees of the seeds initially planted, are by no means guarantees of their performance in synthesizing the complex organic compounds of higher nutritional values. First place may well be given to the proteins and their essential amino acid constituents as a criterion of quality. Such a criterion is one much more exacting than any we have formerly used. As measured by ashing in sulfuric acid, total nitrogen multiplied by any simple mathematical factor to which a majority of the analysts agree, can no longer be considered a guarantee for quality in our forage feeds. Certainly amino nitrogen by the Van Slyke method is a more significant criterion than is total nitrogen. Still better is a more complete amino acid assay, either chemical, spectrographic, or microbiological. The best and final test of plant nutrition is by means of the higher animals themselves. Quality is no longer measurable by simple ash or inorganic analyses. Nor can much credence be placed in any determination of quality that operates on such a belief.

Many of the fertility elements are known to be essential in plant and microbial processes. But by what chemical or other reactions they serve is still unknown. Such cases as calcium essential for protein synthesis by legumes; calcium for nitrogen fixation by microbes in vitro; phosphorus for fermentation, and energy transformations; magnesium for photosynthesis; copper and iron for our respiration; and numerous other cases of essentiality in organo-synthetic services by the inorganic elements, tell us that they are not materials in construction of the final products. They serve as tools during the construction or synthesis of those organic elaborations we call food compounds. Does a chemical examination of such finished compounds reveal all the tools that were required on the construction job, and then were apparently removed after its completion? Little do we appreciate the extent to which soil fertility serves only as a tool. The relation of soil fertility to the quality of the final construction will not be understood, much less appreciated, until all the processes of construction, as well as the final products, are carefully analyzed and are completely understood.



*Food creations by plants are dependent on complicated reactions between the soil colloidal complex and the colloids of the root.* Viewed broadly, more food quality in forage plants demands more complicated synthetic services by the plants. These services demand more nutrients from the soil and a more specific balance in the array of them in the plant's ration.

The total amounts of nutrients mobilized into a crop from a particular soil depend on: (1) the amount of crop root surface and clay surface in contact; (2) the respective ionic activities at their interfaces; and (3) the time periods of their contacts. The amount of root surface varies with different crops. The clay surface varies with the texture of the soil. The activities of the soil at its interfacial boundary with the root depend on: (1) the kind, as well as the amount, of clay; (2) the degree of its saturation with nutrient elements; (3) the suite or balanced combination of these adsorbed ions; and (4) the suite of these delivered to the clay from the reserve minerals and organic matter. The activities of the root at its interfacial boundary with the clay depend on: (1) the nature of the root membrane or cell wall as it is modified by the soil contact; (2) this membrane as it is modified by the internal root cell physiology; and (3) the plant's physiological behaviors modifying the root cells' contents and their activities.

Nutrient ion movement from the soil to the inside of the cells of the plant root may well be viewed as an ionic activity or movement: first, from the colloidal clay to the colloidal membrane around the cell, or cell wall, and, second, from this membrane to the colloidal (or solution) contents within the cell. As the ions moving into the root are taken out of action, through their elaboration or synthesis into un-ionized organic compounds, the movement of other ions will continue or be hastened in the same direction. If the cell contents are a colloid of high adsorptive and speedy synthetic capacities, like those of the legumes which synthesize many proteins, then much fertility will go into the plant as a guarantee of higher quality in the resulting forage. This will be possible if the root cell contents are compounds of decidedly proteinaceous make-up.

However, if the root contains nothing more complex than a sugar solution or other carbohydrates, with little or no colloidal adsorption-exchange capacities, then little mass movement of ions into the root from the clay of the soil could be expected. This movement into the root would also be less expectable when the clay colloid has a high adsorption energy and high exchange capacity saturated largely with hydrogen. In fact, in that event, movement in the reverse direction — namely, from the root to the clay — may be expected. This is probable since the colloidal root cell membrane might suffer its own breakdown.

Such behaviors were demonstrated for the nutrient ions of nitrogen,<sup>1</sup> of phosphorous,<sup>2</sup> and of potassium<sup>3</sup> when soybeans were grown with the final crop's (roots, tops, and all) total contents of these nutrient elements amounting to less than that of the planted seed. However, if the cell contents are elaborating the entering

nutrients into colloidal complexes, and into organic compounds by means of which their ionic activities are lowered (a different cell membrane will also be elaborated), then more nutrient ions will move in from the outer or higher activity areas of this cell wall-clay region. All this encourages still more elaboration and more synthetic performances within the root cells for growth. More fertility from the soil and more synthetic elaborations within the root are the basis for more quality as nutritional values in the resulting forage crops. Less fertility in the soil may move inorganic fertility elements from plant to soil and grow a crop of forage with less of nitrogen, or of phosphorus, or of potassium than in the seed that was planted. Such a hay crop (that couldn't be a seed crop) would certainly be poor feed when it contained less of each of the above three elements than was in the seed from which it was grown.

*Laws of ionic behavior by adsorbed elements are different from those for ions in gas mixtures and in dilute solutions.* In contrast to the behavior of ions of ionic mixed gases, the activity of ions entering the root is not alone a function of their mass. Instead, the suites of different ions, with their respective amounts on the clay, influence the amount of activity of each separate ion. In other words, the activity of each ion is influenced by "the company it keeps." This interplay of ions on the clay to influence their respective activities (which activities are independent of amounts adsorbed and exchangeable) is a most important factor (yet unappreciated) in controlling the physiology of the plant. This is particularly significant when, up to this moment, we have measured the total amount of each exchangeable nutrient in the soil, and have

Harold M. Lambert



<sup>1</sup>See references at end of article, page 452.

been content to believe that those combinations are the amounts "available" and are moved into the plant in the measured relative proportions. This interionic effect may be the reason for the pronounced movement into the plant of potassium, as compared to other ions, to encourage photosynthetic storing of its carbonaceousness; or of calcium and its host of cohorts for the successful conversion of the carbohydrates into protein of much less crop bulk. Other physiological differences in the plant, provoked by other differences in ionic activities on the clay, because of variation in the components of the suite, rather than in the amounts of the different ions exchangeable on the clay, can readily be envisaged.

If the suite of ions on the clay, rather than their respective amounts, comes in to control their activities there, then no great stretch of the imagination is required to visualize — inside the root — a similar "interplay" of ions adsorbed on the colloidal cell contents for consequent variations in the elaborations as proteins and other complexes synthesized there. If there is less concentration of protein within the root, there is a lessened degree to which some of the ions on the clay move into the root. There also would be a varied capacity for total ions within the plant. A leguminous root, inoculated and fixing nitrogen to give it a higher concentration of protein within itself, takes in a larger percentage of the potassium exchangeable on the colloidal clay than when the root is not inoculated and when the soybean plant is behaving physiologically as a nonlegume.<sup>4</sup> All this variation in root behavior in relation to soil fertility points out that there are fundamental chemical laws in control of plant physiology, and through these laws there is a control of the nutritional value of the products created.

With a higher concentration of the inorganic elements in balance within the forage, there goes a higher concentration of protein, and, in addition, a smaller total yield of forage. This may occur irrespective of the beliefs to the contrary, namely, that more growth as bulk means better quality as feed. In the experiments reported above, the very reverse of this old belief was found to be the case. There was also more

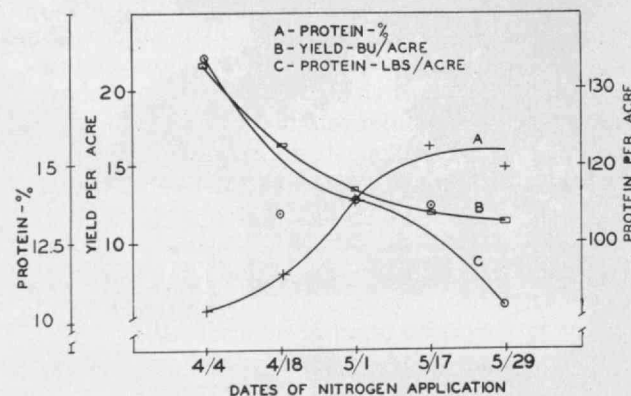
total protein per acre, in spite of less total bulk per acre. We now know that the higher concentration of both protein and of inorganic elements (as evidence for higher quality of feed) can go with the lesser yields of crop bulk.

*Differences in fertility may produce differences in physiological maturity and thereby in nutritional quality.* Some other aspects of plant physiology in relation to feed quality deserve attention — namely, the period in the plant's physiological maturity when there is greatest variation in the suite of ions entering from the soil. Synthetic output, that is, more of carbohydrates or proteins, would be expected to be different, depending on the amount and variety of nutrients taken into the plant. Nitrogen, for example, which is available more generously early, and less plentiful later in the wheat plant's development, encourages much vegetative growth with a starchy grain of low protein concentration, but produces relatively high bulk yields and possibly even a large amount of protein per acre. That reverse situation (with little nitrogen early but a larger amount of nitrogen available later in the growth cycle) may result in less yields per acre but a higher concentration of protein in the grain.<sup>5</sup> It may mean a lower total protein production per acre. If differences in concentration of protein in the grain are considered responsible for these differentiations, "soft" wheat and "hard" wheat are a matter of the time of delivery of a generous amount of nitrogen in relation to other elements. The available nitrogen depends on the conversion of this nutrient from organic to nitrate form by the microbial metabolism of the soil.

The concentration of vitamins in plants deserves some wider consideration in its relation to the fertility of the soil. It raises the question of whether or not the higher concentration of vitamins is a mark of higher nutritional quality. Observations of vitamin C in spinach which had been grown on colloidal clay, under careful control of fertility, suggested a higher concentration of this vitamin when any of the three variables — calcium, nitrogen, and potassium — was in deficiency in relation to the others, as judged by crop appearances and vegetative yields.<sup>6</sup> The suggestion has been made that the concentration of this vitamin or catalyst increases in the spinach when any one of these three tested nutrients is so low as to make the "whipping up," or speedier catalyzing, of its activities necessary. Such a suggestion presents a situation similar to the demonstration of a poorly fed team of horses drawing too heavy a load and being spurred on by the whip. Whether high concentration of a particular vitamin in the forage is a mark of high quality is open to question, particularly if its high concentration is evidence that some nutrient element, and the synthetic processes it supports within the plant, are in deficiency.

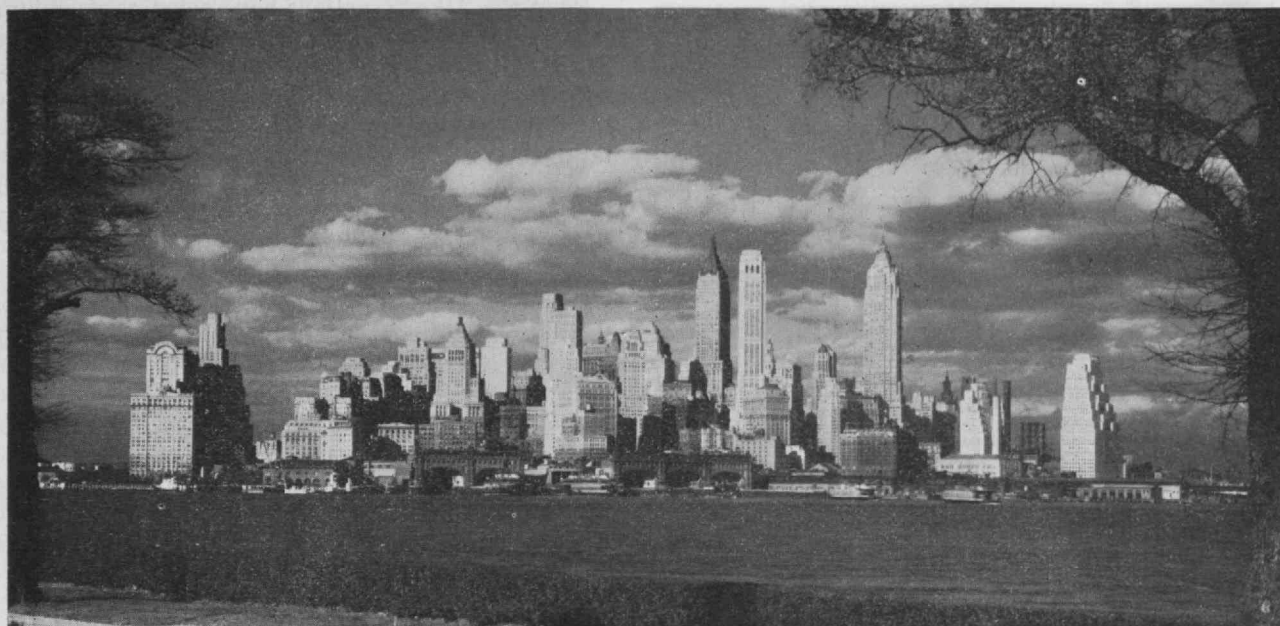
*Production of food of high nutritional value is a noble objective for soil scientists.* Quality of forage feed in relation to soil fertility is a newer concept that is still baffling as an agronomic criterion for wise soil

(Concluded on page 452)



The manner in which the date of application of nitrogen as fertilizer affects yield of wheat is strikingly shown in these curves. Greatest improvement in protein concentration (Curve A) resulted when nitrogen was applied late in the plant's growth. Nitrogen applied early in the plant's physiological maturity produced the largest increases in yield (Curve B), and in total protein per acre (Curve C).





Ewing Galloway, N. Y.

# Federation for Freedom

*Aggressors Must Be Made to Realize that Free Peoples  
Can Meet Force with Superior Force When Challenged*

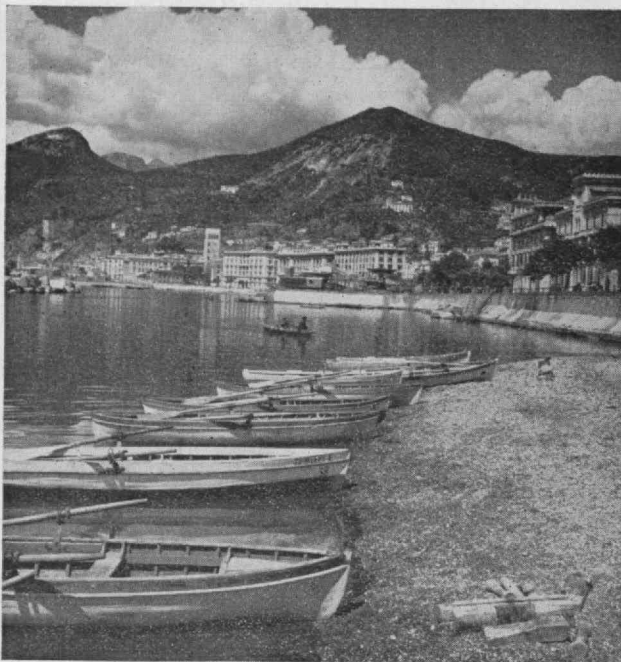
BY JOHN B. RAE

THERE is one redeeming feature, perhaps the only one, in the threat of atomic warfare which hangs over us. It has given an extraordinary stimulus to thinking on the problem of world unity. That this stimulus exists is all to the good. Two world wars in less than half a century have demonstrated that the separate national states which constitute our present world society cannot remain at peace, and the advance of technology in the development of instruments of mass destruction makes it doubtful that they can defend themselves in war. The United Nations, useful as its functions are, is not geared to do anything more than exercise a very mild restraining influence upon its members. We are distinctly in need of the "clear and careful thought implemented by resolute action" prescribed by M. F. Ashley Montagu in his article "Living in an Atom-Bomb World" which appeared in the February, 1950, issue of *The Review*.

It is essential, however, that both the thought and the action should be directed toward objectives that we can reasonably expect to attain in time to help us out of our present troubles. Ultimately, perhaps, we can hope for the creation of a world government which will abolish war, but there is an aura of unreality about the idea that we can realize this hope at once. The most superficial glance at the world today makes it manifest that the spirit of brotherhood for which Dr. Montagu appeals has not yet come into existence, and it is exceedingly doubtful whether fear of the consequences of atomic warfare either can or should be made the basis for world federation. If all we wish to do is to avoid exterminating each other

with atomic weapons, a world union of Soviet Socialist Republics will serve the purpose as well as anything else. Such a union, indeed, would be easier to establish and operate than a federation dependent on consent and agreement among peoples who are going to retain indefinitely their present diversity of language, culture, religion, social structure, and government. We are not, of course, going to take any such step. There are some things, notably our belief in the freedom of the individual, that we will not sacrifice for an uncertain and, on the whole, unattractive prospect of survival. Yet a world democracy is equally out of the question at present. There is no simple formula that will make democracy work automatically; recent history is all too visibly littered with the wreckage of overenthusiastic attempts to impose democracy on people who were not ready for it. It takes time to cultivate a genuine tradition of civil liberty and acquiescence in the orderly functioning of a constitutional system. The successful democracies of today are all products of long and frequently painful development, and they include only a seventh of the world's population — some 300,000,000 people out of a total of approximately two billion.

The proponents of immediate world government appear to have fallen into the not uncommon state of mind which assumes that any problem can be solved by saying, "There ought to be a law" — in this case, specifically, of assuming that a new world order can be established by drawing up a charter, or a constitution, or a blueprint. Human societies are not created by writing words on a piece of paper; they have to



*Fenno Jacobs from Three Lions*

grow. When they unite, they do so because they already have a substantial foundation of common interests, and the process can be exasperatingly slow. It took 80 years and a civil war for the American Union to solidify itself beyond the possibility of disruption.

To suggest that "the Parliament of Man, the Federation of the world" is still a poet's dream does not mean that we should cease to work toward it. It means rather that we had better not waste our energies in trying to take the last step first. The only practical way to begin is to form the nucleus of a free world society from the democratic states now in existence. These states have the community of interests and ideals necessary to make federation feasible, and the current condition of the world gives them a powerful incentive to unite for greater security against the menace of totalitarianism. In concrete terms, this is the proposal now being advocated by the Atlantic Union Committee. It asks that the United States, Canada, Great Britain, France, the Netherlands, Belgium, Luxembourg, and such other democracies as these states may wish to invite, hold a convention to explore the possibility of federation.

These nations have a common cultural heritage, their societies are based on respect for the rights and dignity of the individual, and their economic and military interdependence is an accepted and established fact. In other words, they already constitute a community. This point has been cogently expressed by Walter Lippmann. Referring specifically to the Atlantic nations he writes: "The members of this community may not all love one another, and they have many conflicting interests. But that is true of any community except perhaps the community of the saints. The test of whether a community exists is not whether we have learned to love our neighbors but whether, when put to the test, we find that we do act as neighbors."<sup>\*</sup>

<sup>\*</sup> Walter Lippmann, *U. S. Foreign Policy*, page 135 (Boston: [Atlantic Monthly Press book] Little, Brown and Company, 1943), \$1.50.

That the Atlantic nations have acted as neighbors is a matter of clear historical record. They have fought for each other in two successive world wars, not because they particularly wanted to but because they had to recognize that the security of each was vital to the security of all. The danger that an aggressive totalitarianism may precipitate a third world war has finally driven this lesson home, as is evidenced by the Atlantic Pact and the arrangements currently in progress for co-ordinating the military forces of the signatories. Similarly, the economic relationships of the Atlantic nations, always close, have been steadily growing closer. The European Recovery Program constitutes acknowledgment of the fact that the economic well-being of the United States is inseparable from that of Western Europe. It is not simply a gesture of American benevolence. If Western Europe needs the economic support of North America, North America equally needs a prosperous Western Europe as an outlet for its surplus production.

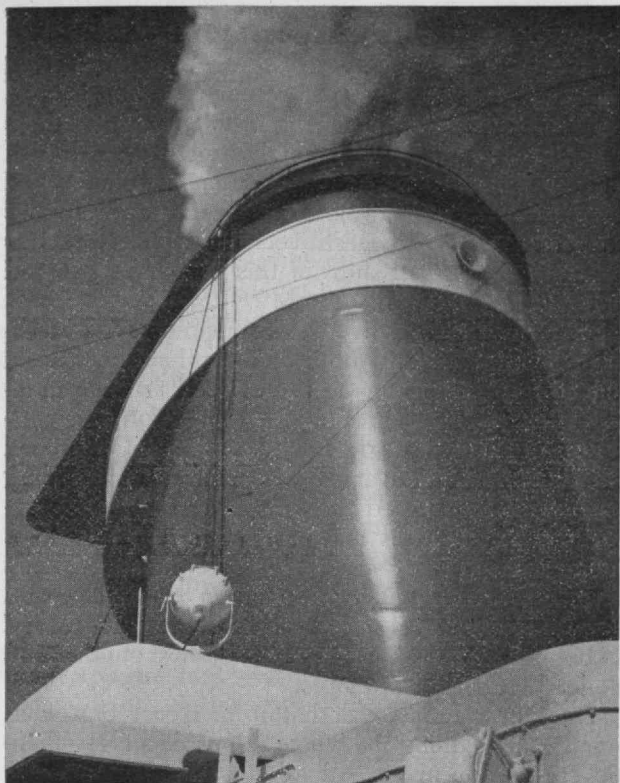
If we had some assurance of a reasonably long period of peace, we might leave these forces of integration to work themselves out in their own time. Unfortunately we do not have any such assurance. The dangers which face the free peoples of the world today need no elaboration; they cannot be met by half measures. The Atlantic Pact is a great step forward toward achieving a common defense of freedom, but it is not enough. It is still only a military alliance, and no such alliance in the past has ever been a lasting method of preserving peace. An alliance, moreover, has the great defect of imposing on its members obligations toward each other without giving them any corresponding control over one another's actions. If the Atlantic nations are going to co-ordinate their military policies, they ought to co-ordinate their foreign policies as well, and that can be done only by federation. To try to follow a common military policy without a common foreign policy is like trying to walk on one leg. It can be done, but it isn't very satisfactory.

*(Continued on page 460)*

*Three Lions*







A. Devaney, Inc., N. Y.

# Roll Stabilization

*Wide and Successful Use of  
Ship-Stabilizing Methods*

*Appears in the Offing*

BY PAUL COHEN

FOR the better part of a century the shipbuilding industry has been witnessing repeated periods of activity in the development of roll-stabilizing devices for ocean-going vessels. A resurgence of interest in this field seems to be currently under way. The United States Navy has resumed tests of a so-called activated tank system, in which water is pumped rapidly from one side of the ship to the other, in response to the signal from a roll-sensitive device. A few months ago an American firm was licensed to manufacture and sell a British system involving movable fins projecting from the sides of the vessel. This system has already been installed on 114 ships of the British Admiralty and on nearly a dozen passenger ships. In the last 90 years there have been many other attempts — by various navies, including the British, French, and Japanese; by steamship lines; by some of the world's foremost instrument and marine engineering firms; and by numerous doughty individuals.

Among the numerous and substantial objectives of these roll-quenching systems are some that appeal to passengers, others to ship operators and insurance agents, and an increasing number to the military. To the layman, the most obvious effect of the rolling and pitching to which all ships (except deeply submerged submarines are subjected) is an acute feeling of misery known as seasickness. Some months ago a cruise of the presidential yacht *Williamsburg* demonstrated that neither high office, military valor, nor any quality of character can bring immunity to this affliction. While the idea of a massive technical effort aimed at the elimination of *mal de mer* may have its humorous aspects (to those who don't get seasick) there are some very serious sides to the problem. Quite apart from the reduction in efficiency that occurs, even

among experienced crews when subjected to prolonged and heavy rolling, it was recognized 20 years ago that while the comfort of crew and passengers could be a matter of economic concern "it may also be of much importance in the case of ships carrying troops, upon whose condition immediately after landing a great deal might conceivably depend. . . . Stabilization may also be advanced as a means of reducing the stresses thrown on the structure of a vessel by a heavy seaway."<sup>\*</sup>

In this connection it is interesting to observe that, in the opinions of noted naval architects, the stresses imposed on the hull by stabilizing equipment are invariably small in comparison with the bending and torsional stresses which the ship must be designed to meet in any case. The inertia or "racking" stresses set up in the superstructure and masts of a heavily rolling ship are naturally reduced by stabilization. Stabilized ships have been proved to be drier and better able to maintain speed in heavy seas. Although this is not necessarily true for all forms of stabilizers, the types which are more economical in their energy requirements are able to operate with less power than is lost in trying to maintain speed in a rolling vessel. Another, although slight, saving in fuel occurs through the fact that, particularly in a following sea, a stabilized ship can steer a straighter course with less yaw, than one that is rolling heavily. Finally, the stabilized ship is less apt to damage cargo or passengers.

Changes in the art of naval warfare have added many new items to this list of advantages. Consider, for example, the masts and upper works of modern fighting ships, cluttered with radar antennae, searchlights, range finders, and other apparatus. Since naval

<sup>\*</sup> *Engineering Age*, April, 1930, page 396.

vessels are generally designed with rather large metacentric heights (that is, with considerable inherent resistance to capsizing) they tend to roll rapidly for ships of their size. Structures high above the water line of a rolling vessel, therefore, can attain velocities in the hundreds of feet per minute, and the stresses which these components must take and eventually transfer to the hull are correspondingly high. A far more serious matter, however, is that the instruments mounted on such upper structures are built to be precision-measuring devices. Superimposed upon the signals of such instruments may be errors due to the movement of the heaving, twisting base on which they are mounted; unless such errors are removed, the data coming from the measuring devices are essentially useless for any practical purpose. Therefore, the individual components are either mounted on stabilized platforms, which are complex, heavy, and expensive pieces of equipment, or the data they yield are continuously corrected for the instantaneous position of the ship by comparison with some fixed reference such as a gyroscope.

### ***A Common Misconception***

One of the misconceptions frequently encountered regarding the purpose of roll-stabilizing devices is that they will make a ship a better gun platform, or eliminate some of the equipment that compensates for ship motion. Qualitatively, this is at least partially true, but unfortunately current stabilizing equipment still permits residual rolls of the order of two degrees. Although a two-degree roll may be acceptable to a lady with a queasy stomach, it is nearly as bad as a 20-degree roll as far as gunfire is concerned. Roll stabilization should permit lighter and simpler compensating equipment for the armament system, but equipment of far better performance than is now available is needed before major savings can be made in this field.

In addition to roll, one must not forget pitch control, a subject from which ship designers have so far backed away. The fact that a ship will still pitch, after it has been roll stabilized, is perhaps one reason why greater efforts have not been made to stabilize aircraft carriers (although, in 1924, roll stabilization equipment was installed in the 10,000-ton Japanese carrier *Hosyo*). The torques required to overcome the rolling effects of waves on a large ship can reach many thousands of foot-tons, although as previously mentioned, the net stresses to which the hull is subjected may be reduced. To eliminate pitch, however, would require tremendously larger forces and, very likely, far stronger hulls. Since pitch causes far less danger to a ship and less discomfort to her passengers, the concentration of inventive effort on antiroll devices is understandable.

About 1870, Froude pointed out the advantages of bilge keels in dampening heavy rolling, and these are now virtually standard equipment on all ships whose characteristics are such that bilge keels of manageable size can do some good. In determining the ship's center of gravity and of buoyancy — in specifying its metacentric height, in other words — the designer has another control over the way in which a ship will roll. If the resulting metacentric height is low, the re-

sult is a "tender" ship having a slow, smooth roll. When such ships are also of large size, they can have rolling periods as long as 25 seconds or more. On the other hand, a large metacentric height will produce a "stiff" ship or one that strongly resists being tipped, and recovers with an abrupt, violent motion. When stiff ships are of small beam they tend to roll with a rather short period. Destroyers are typically in this category, and small ships of this type have had roll periods as low as four seconds.

Of the various "active," as compared to the structural, methods of roll stabilization that have been tried, only three systems have been applied to large numbers of ships. These are: (a) the various forms of antiroll tanks that were originally developed in Germany, and which, in an advanced design, is currently being tested by the United States Navy; (b) the Denny-Brown fin stabilizers that parallel an invention by a Japanese engineer; and (c) gyroscopic stabilization that was rather widely applied in the 1920's and early 1930's, but has since been dormant. Prior to, and in between, these efforts have been a host of other and generally abortive attempts.

One, for example, was that of Sir Henry Bessemer, who, in 1875, hung the whole saloon of a cross-channel steamer on pivots. A hydraulic cylinder was then placed between this room and the ship, and a human operator, watching a spirit level, was supposed to operate the cylinder with proper timing so that the room remained upright as the ship rolled. The success of this experiment may be judged from the fact that the saloon was soon firmly attached to the hull in the usual manner. Another noted British engineer, Sir John I. Thornycroft mounted what was, in effect, a very large pendulum in a 230-ton steam yacht. A hydraulic cylinder fastened to the pivot axis of the pendulum could swing it to one side or another and thus shift the center of gravity of the ship. This was one of the first of the "moving ballast" types of antiroll devices. Thornycroft used a small pendulum and an electric relay system to furnish the control signals, and while the system did dampen roll to some extent, it was not satisfactory. Neither Thornycroft nor Bessemer grasped the principles and possibilities of the gyroscope as a roll-detecting method.

### ***Stabilization with Water Tanks***

It had been known for many years that water, slopping about in a ship's hull, could greatly alter the ship's rolling characteristics, frequently for the worst. In 1881 the British Admiralty began experiments with water tanks that ran from one side of the ship to the other, and with movable walls that could change the dimensions of the chamber. It was shown that the roll dampening effect was markedly affected by the depth of water in the tank, and that this method had a tendency to extinguish the roll to a much greater degree than bilge keels. But in heavy or confused seas, it did not perform well, and this approach never proved itself sufficiently to merit commercial use. In 1907, however, Frahm invented a system in which water was allowed to flow between two tanks on opposite sides of the ship but at a rate that was at least partially controlled by means of air valves. This system definitely reduced roll, and in a practical and



relatively inexpensive manner. Eventually, the German shipbuilding firm of Blohm and Voss, which controlled the patent rights, installed this system on more than 1,000,000 tons of merchant and military shipping, including some of the most famous North Atlantic liners of the prewar decades. It made comfortable ships out of some notoriously hard rollers, and it was installed in ships as large as the *Europa* and the *Bremen*. There was some noise from the moving water, and the total weight of the tanks and their contents varied from about 1.3 to 1.5 per cent of the ships' displacement. However, these tanks could only reduce the roll (for example, from 16 degrees to five degrees) — not eliminate it, and the narrow inherent frequency range of the system did not always correspond sufficiently well with the very wide range of conditions which ships encountered. The Germans attempted to improve this system by forcing the water in the right direction with compressed air, and when this did not prove quite positive and quick enough, were resorting to pumps when World War II intervened.

It appears, however, that the first to propose a system embodying positive displacement of fluid ballast in accordance with the roll acceleration of the ship is Nicholas Minorsky. The pumps, accelerometer, and improved control circuits are the chief features that distinguish the Minorsky system now being tested by the Navy. Although results have not been announced, this system has the essentials of a practical and effective roll-stabilizing device. Even its inventor, however, does not claim that the new system will eliminate roll, and is content that a reduction in roll of 85 to 90 per cent is sufficient for most practical purposes. That the inherent frequency response of this type of system is still a problem is indicated by the fact that better results are expected in a following sea, when the relative wave period is rather long, than when the waves are being taken on the bow quarters.

The Navy's experiments with this system started in 1937 with construction and tests on dynamically scaled models. These tests were completed in 1939, and full scale tests were begun in May, 1940, on a 1,160-ton ship. A number of mechanical difficulties were exposed, including violent hammer blows in the hydraulic system and noise problems in the control circuits, the latter arising in part from pickup of hull vibrations by the accelerometers. Before these difficulties could be corrected, the increasingly acute problems of national defense caused the ship to be diverted to strictly military duties late in 1940. Tests have now been resumed.

### **Antiroll Fins**

Another method of roll stabilization that has seen rather wide application is the so-called activated fin method. A British patent of the 1890's suggested the creation of stabilizing torques by fins acting like the ailerons of an airplane. However, this thought failed so thoroughly in initiating any practical development that the honor of inventing and first applying antiroll fins on ships must go to a Japanese engineer, Shintaro Motora. During the mid-twenties, while he was in charge of the towing tank at the Nagasaki Dockyards of the Mitsubishi Shipbuilding Company, Dr.

Motora installed stabilizing fins (actually horizontal rudders) to several Japanese ships, including a 1,700-ton mine sweeper and a 3,600-ton passenger steamer. Though his control and hydraulic circuits were somewhat crude, and the hydrodynamic design of the rudders themselves could have been improved, the device gave a fairly good account of itself, making substantial reductions in heavy rolls, but failing by several degrees or more in wiping out roll completely. His method is described in U. S. Patent No. 1533328. This general approach was later taken in hand by two British firms in the shipbuilding field, and is now known as the Denny-Brown stabilizer.

The fins jut out from either side of the ship near its center and are placed as deep in the water as is feasible, so that pitching of the ship is not so likely to throw them clear of the water. The fins can be withdrawn into the hull when the ship is docking or does not require their use. The power required to operate the gear itself is almost negligibly small in comparison with the over-all power output of a ship, but the fins do add to the drag of the vessel. A basic limitation is that the righting torque which the fins can exert increases as the square of the ship's velocity. This method of roll stabilization is substantially useless when the vessel is at anchor or moving very slowly. Generally speaking, it would seem to be most promising for fairly high-speed ships of medium to low metacentric height. The amount of roll which the fins can remove depends on the size of the rudders and on the speed of the ship, but a typical value might be 16 degrees. As with the other systems mentioned, there is a slight residual roll — of the order of two degrees.

No account of roll stabilization can be complete without mention of gyroscopic stabilization systems, even though they have been inactive for the past 15 years or more. The conception that a large gyroscope

*(Continued on page 454)*

Philip Gendreau, N. Y.



# Wild Life in the Great Court

*The Keen Observer Is Able to Find Numerous Examples  
of Wild Life in the Few Acres of Grass and Trees  
Surrounding the Main Buildings at M.I.T.*

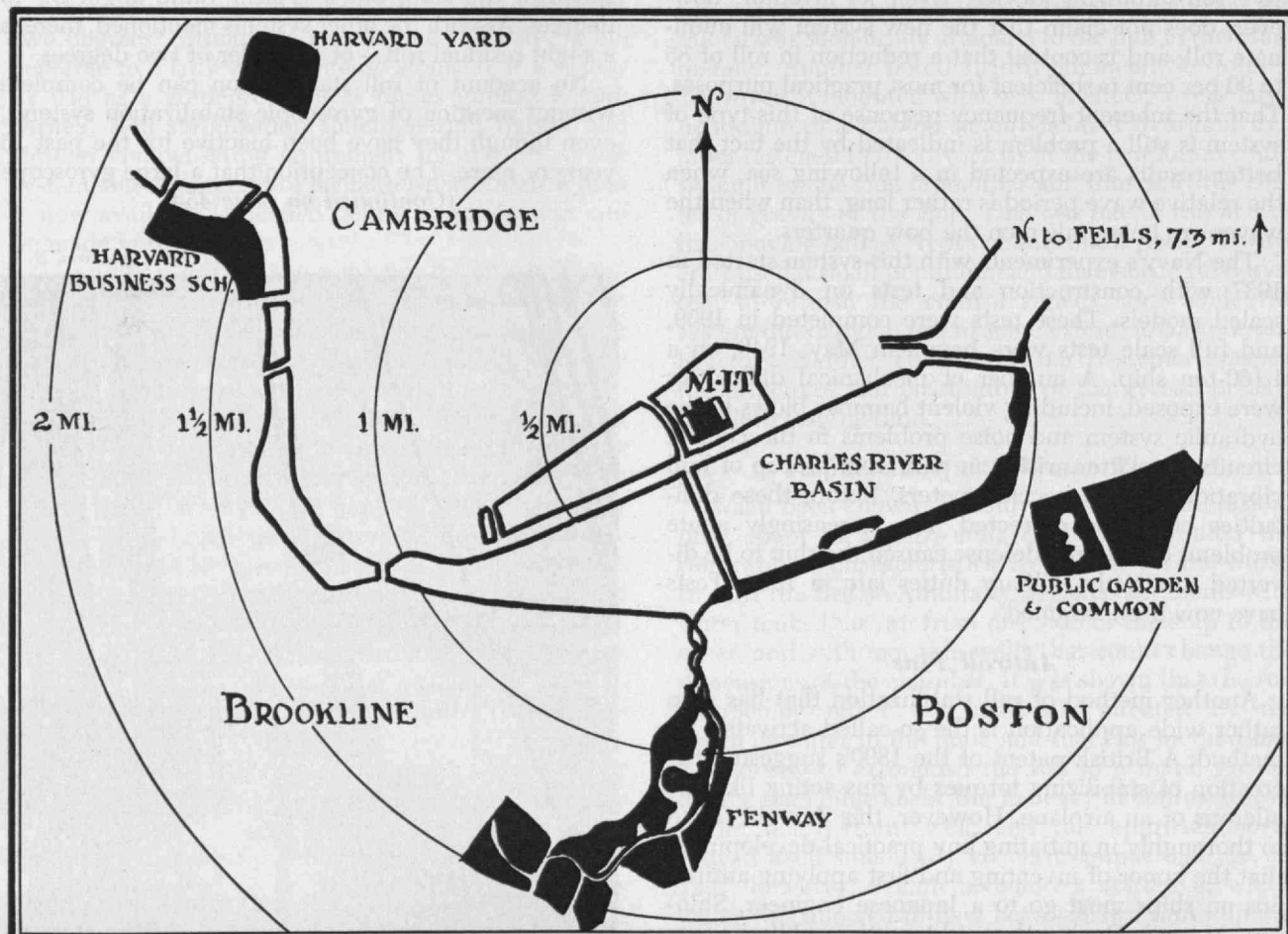
BY CHARLES H. BLAKE

At least the elder inhabitants of the Institute remember when the Great Court was a vast expanse of coarse pebbles crossed and margined by duck walks. There was a tradition, and a well-founded one, that beneath the pebbles lay a bottomless caldron of mud. Unwise deviation from the duck boards could easily involve one in this mud. The plant life consisted almost solely of the margining rows of adolescent rhododendrons under the shelter of polarded Hercules'-clubs. The latter have fulfilled their function and been extirpated, leaving the matured rhododendrons to stand unaided against sun and wind. One is naturally hesitant to ascribe any baleful influences, but the rhododendrons have not grown as well in the corner next to the Bursar's Office as elsewhere.\*

\* Actually this corner gets the maximum sun and wind burn in the early spring. Rhododendrons are especially susceptible so that they are now waxed to keep the moisture in their leaves and are doing better.

The present scene is wholly different. Reinforcement of the mud by successive accretions of pebbles has given a foundation upon which earth rests without danger of subsidence. This, in turn, supports grass, almost from wall to wall, upon which one may not only tread with safety but even sun-bathe. Along the sides are rows of well-grown elms and pin oaks. The subsidiary courts have a somewhat less formal array of trees, including there, and near the main lobby, some hawthorns and flowering fruit trees. Other shrubs continue beyond the court almost around the main group of buildings, hiding the foundations of the structures. Aside from the trees on Memorial Drive, the Great Court affords the only considerable area of trees and grass for nearly a mile in any direction.

It would be quite impossible to introduce plants and soil for them without also bringing in a varied assortment of animals and plants. Soil depends for its



Map of the Institute and environs. The shaded areas provide food and protection for migratory birds whose ports of call include the "land of the bean and the cod."



very existence on the activities of incredibly numerous, and mostly very small, organisms. These unseen animals — protozoans, threadworms, mites, spiders, and minute insects — are matched on the plant side by even more numerous bacteria and fungi. This invisible wild life forms the mudsills upon which the visible part of the living world is erected.

The next larger and correspondingly less numerous animals and plants are earthworms, grass, and other small herbage. Here also is the place of the Japanese beetle. At this level, organisms have existence for the average observer. Since the resolving power of all vertebrate eyes is rather similar, this size range is where potential food for birds begins.

That there should be earthworms in the sod, and insects feeding on the plants, seems meet and proper as well as that there should be dandelions and *Galin-soga* in the grass. Less to be expected were some wild blue violets under the rhododendrons and since killed out by application of peat moss.

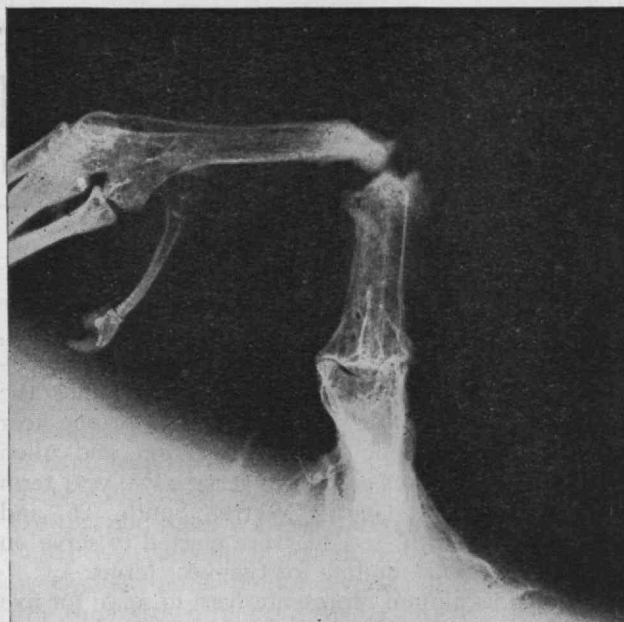
Except for English sparrows, starlings, and street pigeons, there seem to be few or no birds in the Great Court. During most of the year this really is the situation and is what the usual visitor would expect. Why should other than fully urbanized birds wish to dwell there? Much passing to and fro, a limited variety of shelter, nest sites, and food, and well-trimmed lawns do, in fact, offer rather little to attract the wilder birds. The area is so limited as to be capable of supporting only about one pair of any one species. However, our residents are slightly more varied. One, or even two, sparrow hawks may be found at intervals throughout the year. For a perch they prefer the ladder of the powerhouse chimney or the meteorological instrument tower. During the winter they subsist to some extent on English sparrows and starlings. In the summer a few grackles can usually be found feeding in the Court; where they nest, I do not know.

The limiting factor seems really to be lack of nest sites or nest material for most birds. Mud and uncut grass would probably encourage robins to stay. Even the versatile English sparrow must adopt some expedients. I have seen one nest, over a light at the top of the portico, that was only a ring of twigs in a space two inches high. Another was in a bush and was a 10-inch ball of twigs with a side entrance to the cavity within the ball. In this case the bird had reverted to the type of nest normal to its family, the weaver finches.

It is during the migration periods in the spring and the fall that our Great Court comes to life. During these times, mostly April, May, and October, I have seen 34 species, which could only be migrants, in the

Court and on the river side of Buildings 1 and 2. Most of these were various thrushes, warblers, and sparrows. More conspicuous species — catbird, Baltimore oriole, and scarlet tanager — have also

Henry B. Kane, '24



*Radiograph of fractured leg of woodcock who vainly and tragically attempted entrance to the Admissions Office.*

occurred. Eight other wild birds seem to be on record as in, or flying over, the Court and two more have been seen within a few feet of the back of Building 10.

The mere presence of trees is hardly enough to account for so many birds. In spring the south-facing court with the high walls of the main buildings on three sides is a natural trap for birds descending in the early morning. Once down for the day, they will not take off over the treeless expanse to the northward by day, since their custom is then to work from tree to tree. Nor can they be driven out to the trees along Memorial Drive. The traffic seems a definite deterrent. They can hardly escape from their trap until a warm night with gentle wind comes. This explanation is reinforced by the very meager occurrence of birds in the Court in autumn. The southward flight would see the trees less readily in early morning and birds might well move on before traffic became heavy.

The most interesting occurrence in the Court was probably the woodcock found dead on the Admissions Office window sill. It had struck the building during the night and its beak and skull were badly smashed. This bird had played in ill luck. One leg had an old break which had healed but not knit. In spite of this, it had been able to get around successfully for at least some months.

During my strolls through the Court, I have only encountered one other birdwatcher, a student in Course XV. On occasions I have rubbed this in to my students in Biology. Perhaps more strange are the birds that do not visit us, such as the chickadee, white-breasted nuthatch, and downy woodpecker. They are frequent enough in other parts of Cambridge but our trees may be too well sprayed and manicured to suit them.

Henry B. Kane, '24



# THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

## Election Returns

**M**EMBERS of the Alumni Association took to the ballots this spring, in conformity with custom, to elect a new set of officers for the year 1950-1951. As a result of this expression of the democratic process, John A. Lunn, '17, was elected for one year to serve as president of the Association, and Allen Latham, Jr., '30, was elected to serve a two-year term as vice-president. George Warren Smith, '26, and William W. Garth, Jr., '36, were elected to serve on the Executive Committee for two-year terms.

Named as alumni representatives, to serve for five years as term members of the M.I.T. Corporation, were: C. Adrian Sawyer, Jr., '02, Pierre F. Lavedan, '20, and Charles A. Thomas, '24.

There were 3,374 valid ballots cast for the election of members of the National Nominating Committee. Successful candidates were: John L. Porter, '00, for District 8; Walter R. C. Russert, '18, for District 9; and Holland H. Houston, '24, for District 10 — all of whom take office on July 1.

Elected to represent their classes on the Alumni Council were: Arthur T. Chase, '86, Salmon W. Wilder, '91, John A. Rockwell, '96, Theodore H. Taft, '01, Edward B. Rowe, '06, Orville B. Denison, '11, Ralph A. Fletcher, '16, Henry R. Kurth, '21, Chenery Salmon, '26, Gilbert M. Roddy, '31, William W. Garth, Jr., '36, Rogers B. Finch, '41, Theodore P. Heuchling, '46, and Donald A. Hurter, '6-46.

## Alumni Day, 1950

**A**LUMNI DAY, 1950, to be held on Monday, June 12, will bring forth several innovations which, if not completely new, at least have not been employed since the end of World War II. The general program of the day — registration in the morning, luncheon in Du Pont Court, a symposium in the afternoon, and banquet in the evening — will follow the traditional pattern, but there will be some variations on past themes.

Eight of the larger departments will hold reunions or forums for those who wish to supplement the remaking of acquaintances with an opportunity to follow recent progress in various professional fields. Thus, between 10:30 A.M. and 12:00 Noon, the departmental programs will include:

**Aeronautical Engineering:** Laboratories will be open for inspection, Faculty members will be "at home" to receive visitors, and coffee will be served in the Du Pont Room.

**Biology:** Inspection tours are planned for the Electron Microscopy, X-ray, Spectroscopy, Biochemical, Instrumentation, and Enzymology Laboratories.

**Business and Engineering Administration:** Symposia will be held on "The Future of Industrial Relations", "Tomorrow's Marketing", "Future Advances in

Accounting," "Changing Administrative Objectives," and "Future Financing Problems."

**Chemical Engineering:** There will be addresses on the new "Engineering Practice School Station at Oak Ridge," "Possibilities in Nuclear Engineering," and a discussion on departmental problems.

**Chemistry:** A discussion will be held on "The Philosophy of Teaching Modern Chemistry."

**Civil and Sanitary Engineering:** Members of the staff will present lectures on the "New Hydrodynamics Laboratory," "Sanitary Engineering at M.I.T.," "Shock Loads and Structures," and "Soil Solidification by Chemical Methods." A movie on Camp Technology will be shown.

**Electrical Engineering:** A colloquium will be held on "Looking into the Future of Communications, Power, Control, and Atomic Energy."

**Mechanical Engineering:** The Department will hold informal discussions on educational philosophy, friction phenomena, materials cutting and processing, vibrations and control, supersonic mechanics, low temperatures, gas turbines, and jet propulsion.

From 12:30 P.M. to 2:00 P.M. an informal luncheon will be served in Du Pont Court.

Most appropriately, the new Charles Hayden Memorial Library will be the scene of the afternoon symposium on "Access to Ideas — Is Reading Obsolete?" William W. Garth, Jr., '36, will be chairman of this event. Symposium papers will be presented by: Colonel E. W. Palmer, President of Kingsport Press, Inc., Kingsport, Tenn.; Andrew Heiskell, Publisher of *Life*, and Vice-president and Director of *Time*, Inc.; and Admiral Luis de Florez, '11, consulting engineer and President of de Florez Engineering Company, Inc.

Between 4:00 and 5:30 P.M. President and Mrs. Killian will welcome Alumni Day guests at an open house reception at the President's House.

Some classes have arranged for predinner gatherings at the Copley Plaza in Boston between 5:30 and 6:30 P.M., and the ever popular Stein-on-the-Table Banquet will be held in the ballroom of the Copley Plaza between 7:00 and 10:00 P.M. Addresses will be given by: Karl T. Compton, chairman of the M.I.T. Corporation; James R. Killian, Jr., '26, President of M.I.T.; and Marshall B. Dalton, '15, chairman of the Committee on Financing Development.

For wives of Alumni attending Alumni Day activities, a similar program has been arranged. Members of the Hospitality Committee will be available between 9:00 A.M. and 12:00 Noon in the Emma Rogers Room (10-340) to welcome Alumnae and wives of Alumni. The ladies will have their own banquet at 7:00 P.M. in the air-conditioned Sheraton Room of the Copley Plaza, which will terminate in time for those who wish to attend the Pops Concert at Boston's Symphony Hall.



**B**USINESS was the order of the day on April 24 as 97 members and guests broke bread at the 275th meeting of the Alumni Council in the Campus Room of the Graduate House, at which C. Adrian Sawyer, Jr., '02, President of the Alumni Association, presided.

Changes in the class affiliations of 68 Alumni — of which 66 were to the Class of 2-44 — were approved. William J. McCune, Jr., '37, chairman of the Committee on Nominations for Advisory Councils, submitted his report which was voted upon affirmatively. In addition to nominating new personnel, it was recommended that the Alumni Advisory Council on Musical Clubs be discontinued since the activities of the Musical Clubs are now under the direct guidance of a full-time Faculty member.

It was reported that, at its afternoon meeting, the Executive Committee enthusiastically endorsed the recommendations of the Committee on Honorary Members, under the chairmanship of Samuel C. Prescott, '94, who nominated Horace S. Ford, Treasurer of M.I.T., as the fourth honorary member of the Alumni Council, and nominated John W. M. Bunker, Dean of the Graduate School, as an honorary member of the Alumni Association. Action on these matters was approved by voting acceptance of the Secretary's report.

Percy Bugbee, '20, chairman of the Committee on Nominations for Departmental Visiting Committees, submitted the names of 23 Alumni to serve on Visiting Committees of all departments of the Institute,

as well as for the Library, the Medical Department, and the Division of Industrial Coöperation. This report was approved, and the names of the Alumni thus nominated have been submitted to the Administration for election by the M.I.T. Corporation.

President Sawyer next introduced to the Council Abbott L. Johnson, 2d, '22, who was visiting from Muncie, Ind., and Saxton W. Fletcher, '18, President of The M.I.T. Club of New York, and representative of that Club on the Council.

Walter H. Gale, '29, Associate Professor of Aeronautical Engineering, and Director of the Summer Session, was introduced by President Sawyer. Professor Gale explained how plans for the 1950 Summer Session emphasized more than ever the rendering of service to industry and to the nation by the Institute. To this end there will be conferences and courses of instruction varying in length from three days to 12 weeks. The utilization of several outside men during the summer will permit greater cross-fertilization of ideas and will relieve our own staff of overload.

Donald P. Campbell, '43, Assistant Professor of Electrical Engineering, was then called upon to speak on recent trends in automatic control, particularly as such methods are being employed for industrial operations in Europe. Professor Campbell first explained the basic philosophy of automatic control devices and cited examples of applications of servomechanisms in the production of nylon, plastic sheeting, paper pulp, in drying processes, and in nuclear energy work — applications requiring constant control of the quality of the output. He also discussed the current trends in this field and in Europe.

### Class Reunions

If, per chance, a scrutiny of the April, 1950, Review failed to reveal information on class reunions which are being held in conjunction with Alumni Day on June 12, The Review reprints below the tidings contained in that issue, and incorporates the most recent news as well:

1890 June 11. A dinner will be held at 1:30 P.M. at the Copley Plaza, Boston.

1891 June 10. Luncheon at The Country Club, Brookline, at 1:00 P.M.

1895 June 12, Alumni Day. Members will meet at luncheon in Du Pont Court. Luther K. Yoder, reunion chairman, 69 Pleasant Street, Ayer, Mass.

1900 50th reunion. June 9-11, The Pines, Cotuit, Mass.; June 9, participation in commencement activities; June 12, special Class table at Alumni Day luncheon, Du Pont Court. Elbert G. Allen, reunion chairman, 54 Bonad Road, West Newton 65, Mass.

1905 June 13-15. Oyster Harbors Club, Osterville, Mass. William G. Ball, reunion chairman, Box 285, Cotuit, Mass.

1910 June 9-11. Hotel Griswold, New London, Conn. Clifford C. Hield, reunion chairman, 719 Nicollet Avenue, Minneapolis 2, Minn.

1915 June 9-11. Coonamesset Lodge, North Falmouth (Cape Cod), Mass. Class get-together preceding banquet at Copley Plaza on June 12, Alumni Day. Azel W. Mack, reunion chairman, 40 St. Paul Street, Brookline 46, Mass.

1920 June 9 week end. Sheldon House, Pine Orchard, Conn. Alfred T. Glassett, reunion chairman, 101 Park Avenue, New York 17, N. Y.

1925 June 9-12. Friday afternoon until Monday morning at Hotel Griswold, New London, Conn. F. Leroy Foster, reunion chairman, Room 5-105, M.I.T.

1930 June 10-11. Riversea Inn, Old Saybrook, Conn. Hermon H. Scott, reunion chairman, 385 Putnam Avenue, Cambridge 39, Mass.

1935 June 10-11. Hotel Rockmere, Marblehead, Mass. John H. Colby, reunion chairman, 25 Jefferson Road, Wellesley Hills 82, Mass.

1940 June 10-12. Cliff Hotel, Scituate, Mass. Saturday morning, June 10, to Monday morning, June 12. Robert A. Bittenbender, reunion chairman, 287 Waban Avenue, Waban 68, Mass.

1945 June 9-12. Mayflower Hotel, Manomet Point, Plymouth, Mass. Friday night, June 9, to Monday morning, June 12. Cocktail party at 5:00 P.M. preceding Alumni Banquet on June 12. Clinton H. Springer, reunion chairman, 44 Church Street, Bristol, R. I.

For other details, please consult the class secretary or reunion chairman.

## **Development Fund Exceeds \$12,000,000**

**A**N unrestricted gift of \$1,000,000 given to the Institute by John D. Rockefeller, Jr. was announced by Marshall B. Dalton, '15, chairman of the Committee on Financing Development, at a meeting of the Development Fund Program held in Cambridge on April 22.

Addressing the third meeting of more than 200 alumni members of the National Committee on Financing Development, which was established in 1948 to "fund M.I.T.'s independence" through the current \$20,000,000 Development Program, Mr. Dalton reported that including the Rockefeller gift, the total to date is \$12,162,309.

In making the gift to M.I.T., Mr. Rockefeller wrote President Killian that "because of the Institute's outstanding position of leadership in the field of science, the high order of service rendered by it, as well as the promise of future achievement which it gives, I am glad to have a part in the effort to broaden its educational program and strengthen its financial condition.

"That the Institute may continue and expand its strategic service to all interested in the advancement of science for the betterment of mankind, irrespective of national boundaries, is my earnest hope and confident belief. Without in any way desiring to restrict the use of this gift, may I say that the part of the development program which provides for continuing operating needs appeals especially to me in that it is directed toward the buttressing of the Institute's financial stability and independence as a private institution."

Replying to Mr. Rockefeller on behalf of the Institute, Dr. Killian said: "It is our intent to utilize your gift in this way, and we are particularly happy to do so because I believe it will stimulate other friends of M.I.T. to make similar unrestricted contributions. The Institute's primary need at this point is for funds to stabilize the support of its current operations. I feel that the confidence you have expressed in our program at the Institute is one of the happiest auguries for the success of our Development Fund campaign, and that it will be heartening to all private institutions which, along with M.I.T., are seeking to fund their independence."

Announcement of Mr. Rockefeller's gift was the high light of a full day's program in which progress on the Development Program was reported from alumni representatives throughout the nation, and those attending had opportunity to visit the Charles Hayden Memorial Library and other buildings erected since the establishment of the Fund Program.

During the morning, Mr. Dalton opened the meeting in Huntington Hall and called for regional reports from chairmen of the seven regions into which the country has been divided.

Boston, representing the New England states excepting Connecticut, reported \$2,496,965, according to Raymond Stevens, '17, Vice-president, Arthur D. Little, Inc., who is vice-chairman for the region. New York and Long Island, the Newark area of New Jersey, and Connecticut raised \$5,003,053, according to Dun-

can R. Linsley, '22, vice-chairman of that region, and Executive Vice-president of the First Boston Corporation, New York.

For the region covering Greater Philadelphia, eastern Pennsylvania, southern New Jersey, Delaware, Maryland, Washington, D. C., and Virginia, Walter J. Beadle, '17, vice-chairman of this region and Vice-president, E. I. du Pont de Nemours and Company, reported \$1,932,957. Pittsburgh, West Virginia, Ohio, Kentucky, and Tennessee, through Howard H. McClintic, Jr., '19, President, Ferguson and Edmondson, reporting for Paul W. Litchfield, '96, chairman of the Board of the Goodyear Tire and Rubber Company and vice-chairman of the region, announced \$1,117,077.

Louis H. G. Bouscaren, '04, Vice-president, Stone and Webster Engineering Company of Chicago, as vice-chairman for the region covering the midwest section of the country, reported a total of \$552,945. William J. Sherry, '21, President, Sherry Petroleum Company of Tulsa, Okla., reporting for Horace R. Bennett, '16, President, Union Producing Company, Shreveport, La., announced \$495,776.

For the Pacific Coast, the Rocky Mountain region, and Hawaii, Mr. Dalton reported for William L. Stewart, Jr., '23, of Los Angeles, Executive Vice-president of the Union Oil Company of California; Samuel W. Selfridge, '13, of San Francisco, Assistant Treasurer of the Standard Oil Company of California; and H. W. McCurdy, '22, of Seattle, President of the Puget Sound Bridge and Dredging Company, as follows: \$563,533.

Contributions reported by the regional chairmen showed \$4,242,900 in gifts from national corporations; \$4,878,258 in special gifts; and \$3,041,150 in regional subscriptions. Mr. Dalton said these figures indicate that M.I.T. continues to enjoy increasing support from industrial corporations. From 1927 to 1948 corporation support accounted for 7 per cent of all gifts; in 1948 it amounted to 26 per cent. Ninety different corporations contributed to the Institute between January, 1948, and June, 1949.

## **Lowell Institute Graduates 100**

**A**T the 46th graduation exercises of the Lowell Institute School, held in Huntington Hall on the evening of Wednesday, May 24, approximately 100 students received graduation certificates, according to an announcement by Arthur L. Townsend, '13, the School's Director.

Greetings from President Killian and the M.I.T. Corporation were delivered by Julius A. Stratton, '23, Provost of the Institute. Horace S. Ford, M.I.T. Treasurer and a long-time friend of the School, also addressed the graduates. In traditional manner, Ralph Lowell, trustee of the Lowell Institute School, presented the graduation certificates. Mr. Lowell is president and chairman of the Boston Safe Deposit and Trust Company, and has been a term member of the M.I.T. Corporation since last fall.

The principal address was given by Lewis K. Sillcox, Executive Vice-president of the New York Air Brake Company. A leading industrialist, Dr. Sillcox is also well known for his interest in education.



# BUSINESS IN MOTION

## *To our Colleagues in American Business . . .*

An important part of Revere's contribution to American industry is rendered by the Technical Advisory Service. This is a body of capable engineers and technicians, located in all parts of the country, who collaborate with customers and prospects and in so doing provide liaison with Revere Research. Their work includes not only advice on the selection and specification of the Revere Metals for specific applications, but quite often involves the solution of manufacturing problems. The Technical Advisor, or "T.A." as we call him, has an extremely interesting job. One call may be upon a great shipyard, the next upon a jeweler, and the following one on a hardware manufacturer. Each T.A. tends to specialize to a certain extent along the natural lines laid down by his education and experience. Since the group is highly diversified, it is always possible to call into service the man or men most familiar with a given industry or problem. Here are several instances of the work done by Revere T.A.s.



- A shipyard was using electrolytic copper to make large-diameter pipes to carry cooling water to the condensers. The copper was purchased in sheets, formed into shapes of varying degrees of complexity, and brazed. The T.A. suggested that while electrolytic copper can be brazed, phosphor-deoxidized copper is far superior. He recommended that a trial be made of a few sheets. During a subsequent call on another matter the T.A. asked what the results had been. He was told that the phosphor-deoxidized

copper was very much better; the ease of forming and brazing saved a great deal of time, more than making up for the extra cost of the alloy.

- The manufacturer of a clothes dryer reported difficulty in drilling aluminum tube and aluminum extruded shapes, due to burrs around the holes. The drills used were found to be unsuitable for the purpose, so the T.A. obtained a high-spiral drill, ground it to the right rake and point angles in the Revere

machine shop, and tried it out on samples from the customer's order. Clean holes were produced with almost no burring. Elimination of a de-burring operation reduced manufacturing costs.

- A large hardware manufacturer was buying and stocking too many types of materials, many of them differing only slightly. The T.A. Service collaborated with the engineering and production departments, and recommended simplified specifications for 225 items out of 360. Result: purchase of larger

quantities in the most economical sizes, with reduction of inventories, and lessening of clerical work. The first year showed a saving of about \$25,000.

In reporting these three examples Revere gives itself no special credit, since work of this kind is undertaken by suppliers in all industries, paper and glass, chemicals and plastics, felts, rubber, and so on. The point we stress is that you can obtain not only materials, but also the know-how and knowledge back of them, if you but allow your suppliers to work closely with you. Why not try it? The results may amaze you.

## REVERE COPPER AND BRASS INCORPORATED

*Founded by Paul Revere in 1801*



**Executive Offices:**

**230 Park Avenue, New York 17, N. Y.**

# Mast and Tower Problems Solved!

Need an inexpensive easy-to-erect 10 to 60 foot mast that can be climbed safely and which takes practically any kind of antenna?...

- A self-supporting roof-mounted tower?...
- A guyed tower up to 400 feet high for commercial use?...
- Power line masts or towers?...
- Home receiver TV antenna supports?...

As specialists in masts and towers for over 17 years, TRYLON offers a complete, time-tested line at minimum cost for maximum safety and dependability.

Write for literature on any desired type—or, better yet, outline your mast or tower problem and let TRYLON specialists recommend a suitable unit.

## WIND TURBINE CO.

West Chester Pennsylvania  
Robert W. Weeks, '13 Runyon Colie, Jr., '40  
William A. Soley, Jr., '33 Peter G. Park '40

# TRYLON TOWERS & MASTS

## RESPONSIBILITIES OF M.I.T.

(Continued from page 431)

in the country who has not at some time expressed himself on what he felt were the political and military implications of the atomic bomb. It may be hoped that future years will see scientists in other fields do equally well in keeping the general public in touch with new developments.

Technological schools in the United States have been aware of their responsibility to help students obtain the background they need to act effectively within the framework of their responsibilities as citizens. But as you well know, the requirements for an engineer's training are so demanding that the broader educational responsibility of the engineering school often has been more honored in the breach than by observance. As you also know, M.I.T., as part of its Development Program, is presently increasing the emphasis on humanities and general education.

This question of the general education part of the engineering program has been subject to more discussion and investigation than any single aspect of our activities in recent years. Much of this has come in response to the obvious need of society for more engineers who have breadth as well as depth, more engineers who not only are competent in the laboratory or on the drafting board, but who have good understanding of the world in which they live, and some grasp of the art of dealing with people.

As a result, there has been a stimulating and healthy experimentation going on, not only at M.I.T. but in many engineering schools, to find better ways of teaching the humanities and the social sciences. I was much interested to have the officers of one of our great educational foundations in this country recently make the comment, after having looked over a number of programs in engineering schools, that the renaissance in the teaching of humanities in this country might well come about in our engineering schools and institutes of technology. They are less encrusted with classic traditions; they are more willing and free to try new approaches; and they are blessed with high standards to judge their work in general education as well as their work in science and technology.

A week or so ago the Secretary of State, Dean Acheson, in speaking before the American Society of Newspaper Editors of the present threat to our country, reminded his audience of the common interests of the American people and the responsibilities the safeguarding of these common interests places on all of us. He spoke first of the principles of freedom and diversity and tolerance on which the country has been built, and he called for renewed faith in those principles. I have spoken of what I feel is the responsibility of the colleges and universities in this respect.

Secretary Acheson spoke, too, of the need for a strong defense establishment, and I need not tell you about how M.I.T. is contributing to our military developments. The Secretary spoke of the need for raising standards of living throughout the world. It is obvious that M.I.T.'s contribution here is also very great indeed.

(Continued on page 450)



# TWO CLIMATES ...TWO WEBSTER SYSTEMS

## Parkmerced in San Francisco

Leonard A. Schultze and Associates,  
New York; Harry A. Thomsen, Jr.  
and Aleck L. Wilson, both of San  
Francisco, Architects.

80°

75°

70°

65°

60°

55°

50°

45°

40°

35°

30°

12PM

2

4

6

8

10

12M

2

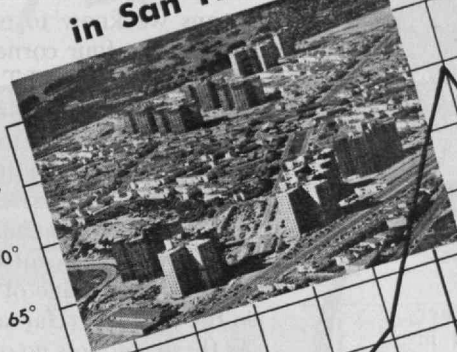
4

6

8

10

12



## Lillian Wald in New York

Frederick L. Ackerman and  
Lafayette A. Goldstone, Architects.

### In San Francisco:

#### "Short-Hour" Heating with Steam

Pictured at left is Parkmerced, the great housing development of Metropolitan Life Insurance Company. Shown graphically is a San Francisco winter day with temperature below 70° in the morning and evening and above 70° at midday.

In designing a Webster Vacuum Steam Heating System for Parkmerced, Consulting Engineer Thomas B. Hunter knew from experience that San Francisco buildings are best served and most economically served by what is known as "short hour" heating, with steam either full on or off entirely.

Knowing too that this type of operation demands the best in radiator valves and traps and vacuum pumps, Engineer Hunter approved the selection of Webster Sylphon Packless Valves, Webster Sylphon Traps and Nash Vacuum Pumps.

Whether it is a Webster Vacuum System for San Francisco or a Webster Moderator System for New York, each room occupant can make a positive heat shut-off with a Webster Radiator Valve—a prime necessity in large, multiple-unit housing.

Address Dept. TR-6

**WARREN WEBSTER & COMPANY, Camden 5, New Jersey**

Est. 1888. Representatives in Principal U. S. Cities

In Canada, Darling Brothers, Ltd., Montreal

### In New York City:

#### Continuous Heating with Steam

Pictured at right is Lillian Wald Houses of the New York City Housing Authority in downtown Manhattan. It is one of eight projects of this Authority, all equipped with Webster Moderator Systems furnished under a uniform specification which is the result of long study by the Authority and its numerous consulting engineers.\*

Look at the temperatures for this New York winter day. Heat is needed all day with the amount of heat varying from 44% of maximum down to 14%. What is necessary—and provided by the "controlled-by-the-Weather" Webster Moderator System—is continuous heating with variation in the rate of heating to meet the changing demand.

\*LILLIAN WALD—Sullivan A. S. Paterno; WOODSIDE—Meyer, Strong & Jones; ALBANY—Fellheimer, Wagner & Vollmer, Architects and Engineers; SOUTH BEACH—V. L. Folotico Associates; TODT HILL—E. V. Marquis; BRONX RIVER—Sullivan A. S. Paterno; DYCKMAN—Sullivan A. S. Paterno; FARRAGUT—Paul Wunderlich.

Wherever you are—whatever your climate and heating requirements—there is a Webster System to fit your needs, and you are almost sure to find a long-resident Consulting Engineer in your community who knows your climatic requirements and knows from experience how well Webster equipment can serve you.

**Webster**  
**HEATING**

**THIS CATALOG #123  
PROVIDES  
ALL THE ANSWERS**

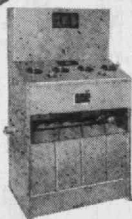
**TO YOUR  
PURE WATER  
Problems**

Here are highlighted the advantages of either distilled water or demineralized water as used in practically all manufacturing and processing operations which call for Pure Water. Catalog #123 presents an entirely new approach in solving Pure Water problems. Send for your copy today!



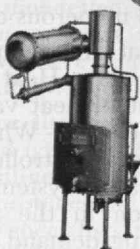
**DEMINERALIZED  
WATER**

**B**ARNSTEAD Demineralizers can save you money in your operations with high-test mineral-free water. For whether you need 5 gallons an hour or 1000, Barnstead Demineralizers produce water of far higher purity at lower cost with a minimum of maintenance. Let a Barnstead Pure Water engineer show you how Demineralized water can save you money and increase productivity. Detailed recommendations will be sent without obligation.



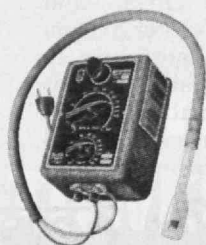
**DISTILLED  
WATER**

**M**ANY products and processes requiring the highest quality chemically pure, sterile water turn to Barnstead for both Laboratory and Industrial Stills, producing for over 70 years absolutely sterile water of unvarying consistency . . . a record without equal in the scientific and industrial world. With over 100 sizes and models . . . there is always the **RIGHT** Barnstead Still to meet all of your Pure Water Requirements.



**ONLY 30 SECONDS  
to Test Water Purity  
WITH THE BARNSTEAD METER**

For Demineralized or Distilled Water. Indicates purity of water on scale calibrated 0 to 15 p.p.m. as NaCl impurities. Complete with cord and plug. Electric eye indicates correct setting. Bulletin 119 gives complete information.



**Barnstead**  
STILL & STERILIZER CO.

26 Lanesville Terrace, Forest Hills, Boston 31, Mass.

**RESPONSIBILITIES OF M.I.T.**

(Continued from page 448)

What may not be so obvious, perhaps, is M.I.T.'s contribution to international understanding which Acheson spoke of when he said: "We must use every means we know to communicate the value of freedom to the four corners of the earth."

There are at M.I.T. over 420 foreign students this year. The applications run into the thousands, and we have made every effort to absorb as many qualified students from other countries as we feel able to do in fairness to our first responsibility which must be the youth of our own country. But this is a large proportion, over 7 per cent of our student population — the highest percentage of foreign students of any college in the country. (Harvard comes next with 5 per cent.) As these students go out to all parts of the world, they will be better authorities on the United States than they could ever have been from reading about it in books.

Also important to international understanding is the growing interest of our students in going abroad for further study after graduation. I myself can imagine no more representative group than these unofficial diplomats who go out to other countries from M.I.T. Sparked by the Fulbright program, which is making foreign study possible for many of our students and teachers, interest in going abroad has steadily increased in the past few years.

Of greatest interest to me, however, are the two student programs which are bringing foreign students to M.I.T. One project is that of a student undergraduate committee which is working with the Displaced Persons program in bringing to this country D.P.'s who wish to study at M.I.T. and are qualified. Six students came to Technology this year through the efforts of this student committee. The Corporation agreed to waive tuition up to one year, but aside from that the students themselves have taken full responsibility. They must assume a legal obligation under the law to provide for the maintenance and support of these D.P.'s for one year.

M.I.T. fraternities have provided meals and housing for them, and the group which brought them over has provided clothes and books and otherwise looked after their welfare. And I am pleased to add that the students recognize that their moral obligations to this group will not end with the termination of their legal obligations. Plans are going ahead to bring an additional group to this country next year.

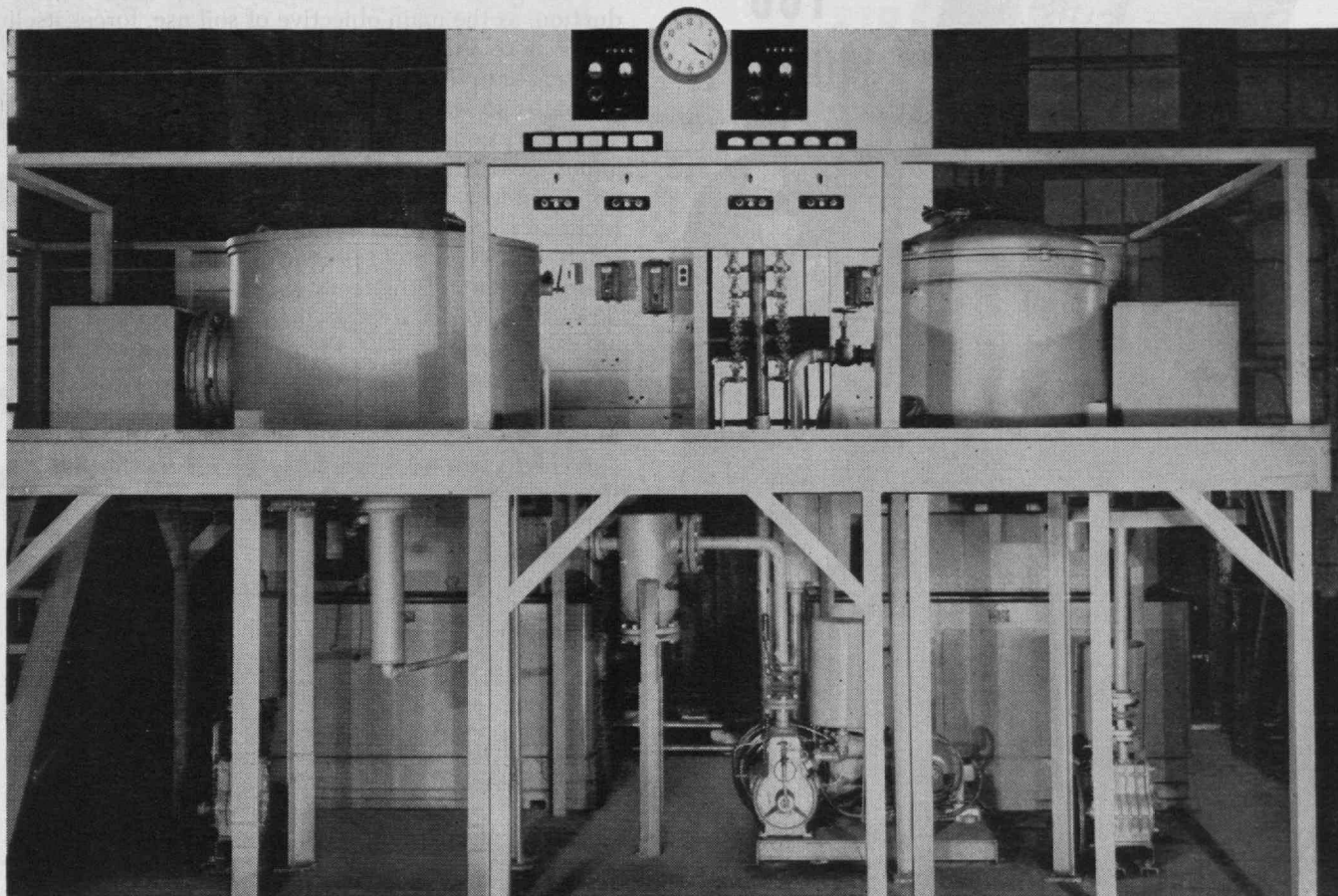
The other student enterprise in promoting international relations through bringing foreign students to the United States, is the Foreign Student Summer Project, begun in 1948. Here again the students themselves have suggested the program and taken full responsibility for it. The college administration has co-operated to the extent of waiving tuition and furnishing two advisers to the student group.

Over 60 students from 16 countries came to M.I.T. in the summer of 1948 under this program. Last summer there were around 80 who came, and they came not only from Europe but from the Near East and

(Concluded on page 452)



*It's 4:20 by the Clock—*



**but in High Vacuum Processes**

*It's Later than You Think!*

#### **Another High Vacuum Success Story**

In high vacuum melting furnaces, like the one above, pressures are maintained as low as  $10^{-4}$  to  $10^{-1}$  mm. Hg. during melting operations.

The product is *made better by removing all gases and volatile impurities*. And the furnaces can be operated *without specialized high vacuum experience*.

In metalizing plastics, costs are being slashed. In food and chemical processing, the qualities of flavor, color, odor, purity, solubility and

shelf life are being increased.

Products formerly "impossible" to make are earning millions of dollars in sales annually — thanks to high vacuum.

High vacuum processes, developed

by National Research, have done these things.

If you are interested in new ways to earn new profits for your company, let us tell you the latest about high vacuum.

INDUSTRIAL RESEARCH • PROCESS DEVELOPMENT  
HIGH VACUUM ENGINEERING AND EQUIPMENT



METALLURGY • DEHYDRATION • DISTILLATION  
COATING • APPLIED PHYSICS

## National Research Corporation

*Seventy Memorial Drive, Cambridge, Massachusetts*

In the United Kingdom: BRITISH-AMERICAN RESEARCH, LTD., London S. W. 7, England — Glasgow S. W. 2, Scotland

# DESIGNED TO...

## SAVE YOU MONEY!



Since 1937 Curtis has made 1862 static torque tests plus many tension and compression tests of universal joints — in their own and in outside laboratories — using both Curtis and competitive joints. Load ratings for all 14 stock sizes of Curtis joints are conservatively based on actual laboratory tests over many years duration. You can depend on them.

Materials and heat treatment of each of the five load carrying members are balanced for strength and resistance to wear. Principal wear comes on those parts which are most easily replaced, namely, the pins.

Curtis patented the first ball-oiler used in universal joints. Curtis pioneered oil grooves in their center blocks and the Curtis "Tell-Tale" lock ring gives visible proof of complete and correct assembly.

Buy direct from Curtis — sole makers of Curtis Universal Joints. Standard joints in 14 sizes are always in stock for immediate delivery.

Look for our registered © trademark on every joint you buy.

**© CURTIS UNIVERSAL  
JOINT CO. INC.**  
Dept. B-5  
SPRINGFIELD  
MASS.

## QUALITY OF FOOD CROPS

(Concluded from page 436)

management. For already too long a time have more bulk and higher percentage concentrations of one or all of the inorganic elements been the criteria which we considered sufficient for measuring the values or services given by the soil fertility. But when food production, as the main objective of soil use, forces itself on us more strongly, when the necessity to purchase "protein-supplements" even for fattening a mature animal is so widely recognized, and when the shortages, for example, in the complete array of essential amino acids delivered by plants are more generally appreciated, then the soil fertility, in its more inclusive range of *trace* as well as *major* elements, will be considered for its protein-producing power or for all the other qualities of the feeds and foods it gives us. Traditional concepts always cling, of course, and newer ones come to replace them only through studious efforts to comprehend the more fundamental facts. Eventually, we believe, the quality of the feed and food crops will be causally connected with the well-balanced and high nutrient levels, or the fertility, in the soil.

### REFERENCES

<sup>1</sup>Horner, Glenn M., "Relation of the Degree of Base Saturation of a Colloidal Clay by Calcium to the Growth, Nodulation, and Composition of Soybeans, *Missouri Agricultural Experiment Station Research Bulletin*, 232 (1935).

<sup>2</sup>Hutchings, Theron B., "Relation of Phosphorus to Growth, Nodulation and Composition of Soybeans," *Missouri Agricultural Experiment Station Research Bulletin*, 243 (1936).

<sup>3</sup>Ferguson, Carl E. and Albrecht, William A., "Nitrogen Fixation and Soil Fertility Exhaustion by Soybeans under Different Levels of Potassium," *Missouri Agricultural Experiment Station Research Bulletin*, 330 (1941).

<sup>4</sup>Hampton, H. E. and Albrecht, William A., "Nodulation Modifies Nutrient Intake from Colloidal Clay by Soybeans," *Proc. Soil Sc. Society of America*, 8:234-237 (1944).

<sup>5</sup>Albrecht, William A., "Wheat Is 'Hard' or 'Soft' According to the Pattern of Soil Nitrogen," *Philfarmer*, Second Quarter 1948. Published by Phillips Petroleum Company, Bartlesville, Okla.

<sup>6</sup>Wittwer, S. H., Schroeder, R. A., and Albrecht, William A., "Vegetable Crops in Relation to Soil Fertility, Vitamin C and Nitrogen Fertilizers," *Soil Science*, 58:329-336 (1945).

## RESPONSIBILITIES OF M.I.T.

(Concluded from page 450)

Far East as well. The students raised the money to finance the project and also planned a summer for the visitors which included trips around the country and visits to American homes. Since this was a \$75,000 to \$80,000 project, it is not a small undertaking for these students to assume!

Thus M.I.T. reflects the changing world of which it is a part. Both as a bulwark in preserving the peace and in strengthening it, this college of ours is playing a very important role. Technology has grown as its responsibilities have grown. And, I am proud to say, "We are still moving ahead."

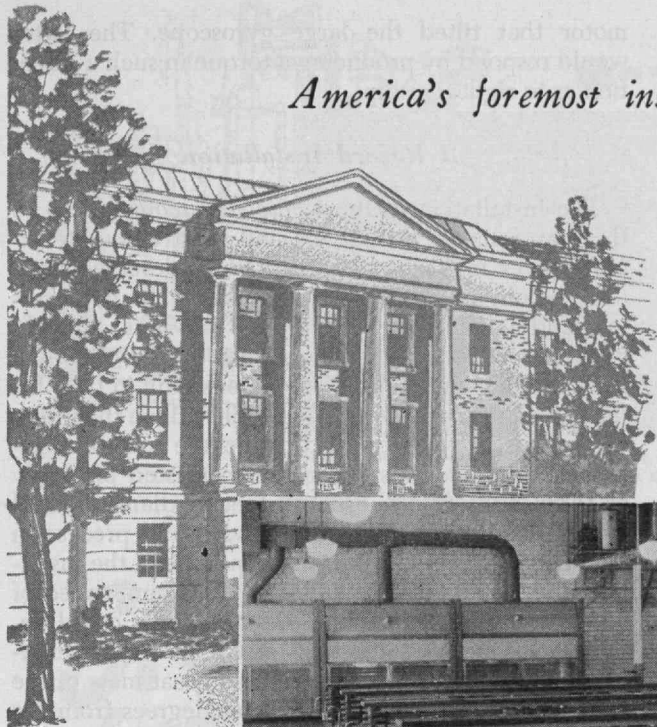


*America's foremost institutions specify . . .*

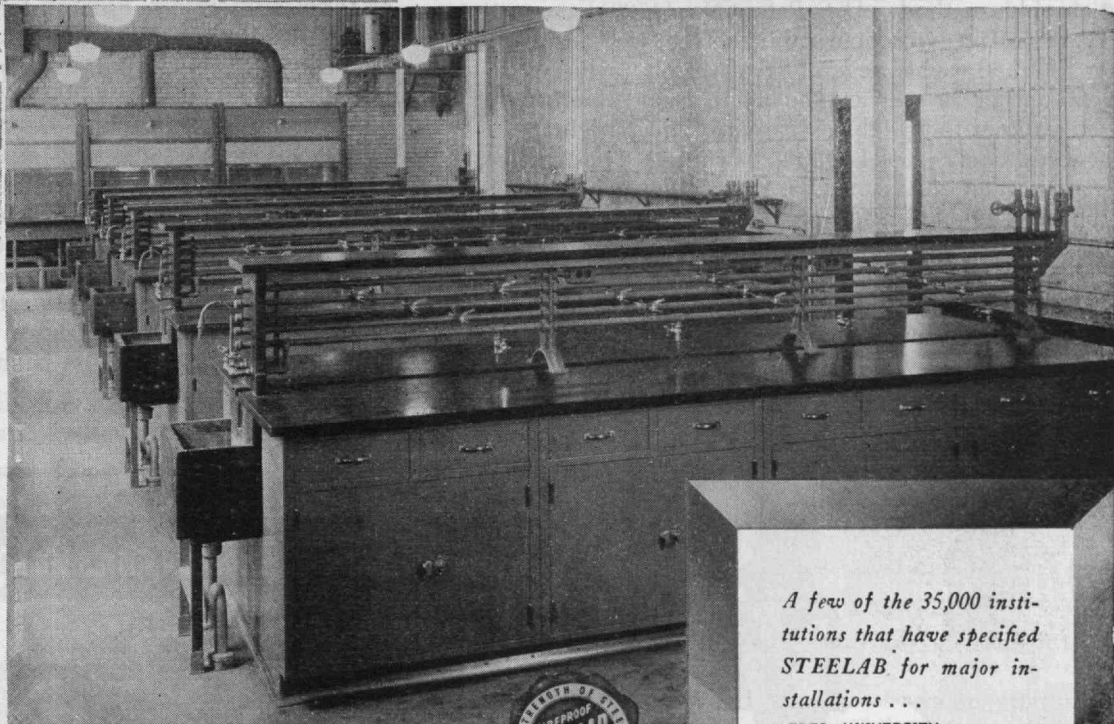
**PERMANENT  
FIREPROOF**

**"STEELAB"**

**LABORATORY FURNITURE**



*State Forestry  
College Laboratory,  
Syracuse University,  
one of the  
leading institutions  
equipped with  
STEELAB  
furniture.*



Lifetime durability, low maintenance cost and functional flexibility have made STEELAB furniture first choice in laboratory equipment in thousands of institutions for more than 20 yrs. Continued choice by these users is the true measure of STEELAB economy and permanence.

## **LABORATORY FURNITURE COMPANY, INC.**

*Creators and Manufacturers of STEELAB furniture*  
37-18 Northern Boulevard, Long Island City 1, N. Y.

• LITERATURE ON REQUEST

*A few of the 35,000 institutions that have specified STEELAB for major installations . . .*

ALFRED UNIVERSITY  
BOWLING GREEN  
UNIVERSITY OF CHICAGO  
CITY COLLEGE  
COLUMBIA UNIVERSITY  
CONNECTICUT UNIVERSITY  
CORNELL UNIVERSITY  
DARTMOUTH  
UNIVERSITY OF ILLINOIS  
JOHNS HOPKINS  
M. I. T.  
NEW YORK MEDICAL COLLEGE  
NEW YORK UNIVERSITY  
UNIVERSITY OF NORTH CAROLINA  
OHIO UNIVERSITY  
PRINCETON  
RANDOLPH-MACON COLLEGE  
RENSSELAER  
ROCKEFELLER INSTITUTE  
ST. JOSEPH COLLEGE  
STEVENS INSTITUTE  
U. S. NAVAL ACADEMY  
UTICA COLLEGE  
UTAH  
WEST VIRGINIA

*and many others*

## ROLL STABILIZATION

(Continued from page 441)

placed in a ship (with its spin axis vertical and its precession axis parallel to the ship's pitch axis) could have a stabilizing effect dates from 1904 when a German named Schlick advanced the idea. He tried it out in an ex-German torpedo boat and claimed considerable success, but later work in England was inconclusive. It can be demonstrated that this essentially passive system can stabilize a ship effectively only against waves of a regular and unique period, a rather rare condition for a ship to encounter. Other nations have also played with gyroscopic roll stabilization, but this system is tied most prominently to the name of Elmer A. Sperry, who described the essentials of his method in U. S. Patent No. 1150311, August 17, 1915. The gyroscopic stabilizers that were installed in about 40 yachts, several naval vessels, including at least one aircraft carrier, and in one major Atlantic passenger liner followed this patent in all important essentials. Sperry took advantage of the fact that movement of the spin axis of a gyroscope is accompanied by the production of a torque in a plane at right angles to the disturbing torque. He mounted a gyroscope having one degree of freedom, much as did Schlick, but also furnished a motor to swing the rotor according to the commands of a small control gyroscope whose only task was to measure the ship's roll. When the ship rolled, the control gyroscope would close a contact that, through relays, actuated the precession

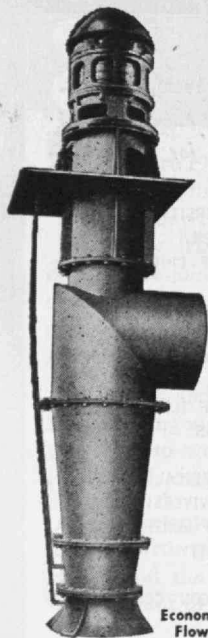
motor that tilted the large gyroscope. The latter would respond by producing a torque in such a direction as to right the ship.

### A Record Installation

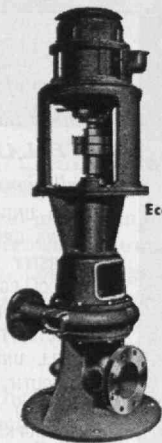
The installation in the *Conte di Savoia*, which to this day remains the largest and most elaborate attempt ever made to stabilize a ship, deserves some description, even though it was one of the engineering landmarks of the early 1930's and was, as such, given ample publicity. The *Conte di Savoia* was a transatlantic liner of 45,000 gross tons built in Italy for the Lloyd Sabaudo Company. While still on the drawing boards, it was designed to include roll-stabilization equipment. This equipment consisted primarily of three huge rotors, each 13 feet in diameter, and weighing 110 tons. With the driving and precession motors, gimbals and associated equipment, the installation weighed 660 tons. At their maximum speed of 910 revolutions per minute, the gyroscopes could deliver a torque, of 5,400 foot-tons. This torque enormous as it may seem, could roll the great mass of the ship only about four and a quarter degrees from the vertical,† although it could wipe out far greater rolls at sea. This, of course, is because serious rolls in a ship are produced by waves whose rates of repetition approach the natural frequency of the ship. Thus, the

(Continued on page 456)

† A static roll of about four degrees is what roll stabilizers are frequently designed to produce.



Economy Axial Flow Pump



Economy Non-Clogging Sewage Pump

**ECONOMY PUMPING** makes sound sense to engineers who know the dollars and cents value of trouble-free pumping service. To pump longer, at lower cost, with less maintenance, rely on Economy Pumps.

Centrifugal, axial, and mixed flow pumps for all applications.

For complete details on any Economy Pump, write Dept. M-3. Please specify type pump in which you are interested.

**Economy Pumps, Inc.**

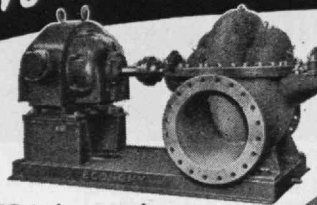
Division of Hamilton-Thomas Corp.  
HAMILTON, OHIO



**Klipfel**

**MANUFACTURING COMPANY**  
DIVISION OF HAMILTON-THOMAS CORP.  
HAMILTON, OHIO

**...PUMPING WITH Economy!**



Economy Double Suction Pump

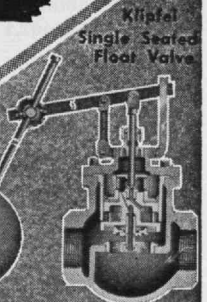
**ACCURATE, DEPENDABLE REGULATION**

**CLOSER REGULATION** ... more accurate control ... that's been the forty year service record of Klipfel Automatic Regulating Valves on installations throughout the land.

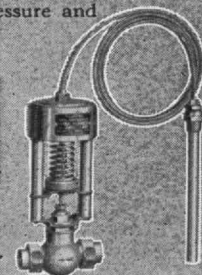
Klipfel exclusive design inner valves assure better closing, more dependable regulation.

Complete line includes pressure reducing valves, float and lever valves, thermostatic valves, back pressure and relief valves and pump governors.

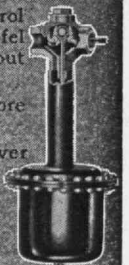
For complete details on any Klipfel Valve, write Dept. M-3. Please specify type valve in which you are interested.



Klipfel Single Seated Float Valve

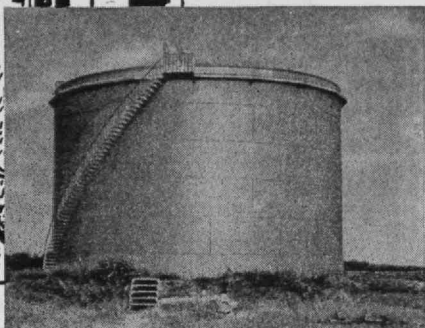
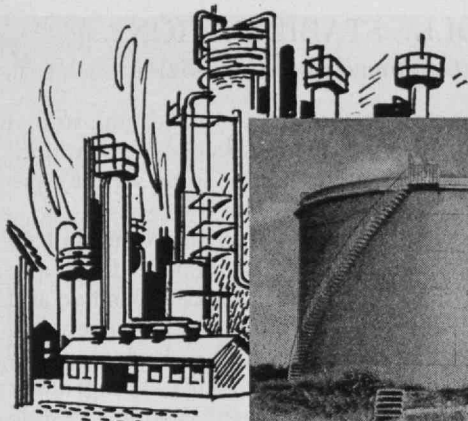


Klipfel Spring Loaded Thermostat

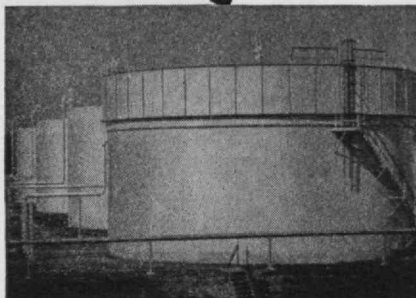


Klipfel Ball Type Reducing Valve





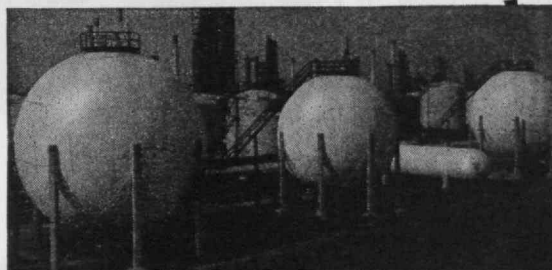
**Graver Floating Roof Tank . . .** for sour crude oil storage . . . for finished petroleum products storage. Capacities from 5,000 barrels up.



**Graver Expansion Roof Tank . . .** for vapor-saving storage of volatile products in single or multiple installations. Prevents breathing and filling losses. Capacities from 5,000 barrels up.

# STORAGE . . . from start to finish by GRAVER

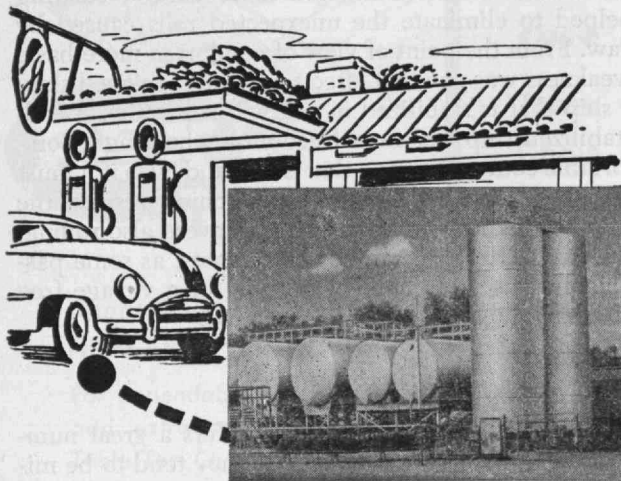
From oil field and refinery to bulk plant and service station . . . producers, refiners, and marketers are choosing Graver tanks for safe, economical storage of petroleum products. Make sure *you* have full facts and figures on the *complete* Graver line. Write for latest data.



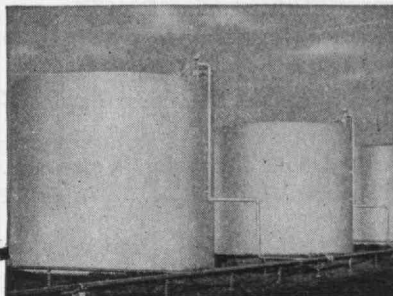
**Graverspheres . . .** for storage of volatile liquids— butane, butadiene, etc.—and natural gasolines . . . for storage of gases. Pressures from 20 to 100 lbs. psi, or more. Capacities from 500 bbls. to 20,000 bbls.



**Graver Pressure Tanks . . .** for storage of propane, butane, etc. for all necessary pressures. Made in bullets (as shown) and spheroidal or cylindrical tanks. Any capacity.



**Graver Bulk Storage Tanks . . .** for storage of all finished petroleum products. Horizontal, vertical, or underground installation. Shop built. Capacities from 550 to 40,000 gallons.



**Graver Cone Roof Tanks . . .** for storage of oil, gasoline, kerosene, fuel oil, etc. Standard-API. All-welded construction. Field erected. Capacities from 50,000 gallons up.

# GRAVER

**FABRICATED PLATE DIVISION**

**GRAVER TANK & MFG. CO., INC.**

EAST CHICAGO, INDIANA

NEW YORK • PHILADELPHIA • CHICAGO • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

## ROLL STABILIZATION

(Continued from page 454)

two effects are close to the resonant condition, so that the roll gets heavier with every successive wave until dampening and other factors cause some sort of equilibrium to obtain.

These rotors did in fact succeed in wiping out all serious roll in the *Conte di Savoia* whenever they were in use. The average residual roll was between two and three degrees. They did not prevent many passengers, however, from being disappointed to a degree that led to complaints. Occasionally, while going along smoothly, the ship would list sharply enough to slide dishes and tableware from the tables, and recovery would take place rather slowly. This was due to a phenomenon which, curiously enough, had never before been reported, and which, in fact, could be studied clearly only in very fast, roll-stabilized ships. These two conditions could be satisfied by virtually no vessel other than the *Conte di Savoia*. Every ship tilts when it turns rapidly because its center of gravity, through which the centrifugal forces are acting, is not coincident with its center of buoyancy. It was discovered that a similar effect was the cause of roll due to yaw, as this phenomenon was labeled. In heavy weather, and in certain types of seas, even a large ship can momentarily be knocked many degrees off course. For that interval, it acts as if it were turning rapidly and takes on a corresponding tilt or roll. Previously, these rolls had been lost among those induced in a more normal manner, for they occurred most sharply in rough seas. The situation was not helped by the fact that the *Conte di Savoia*, as originally launched, was a trifle less stable in yaw, that is, less able to hold a straight course, than was usual in ships of her type. Alterations to the hull, and more careful steering helped to eliminate the unexpected rolls caused by yaw. From the point of view of comfort, a more basic weakness was one that affects any roll-stabilized ship; a ship that is stabilized in roll will still pitch. A roll-stabilized ship has more freedom in choosing a comfortable course than one that is not, and even if it must take the waves so that heavy pitching results, the ship has less total motion than if it were also rolling. But pitch can also produce seasickness, as some passengers who thought they were in for a voyage free of the slightest oscillation discovered.

### In Summary

Nevertheless, roll stabilization offers a great number of advantages, which though they tend to be minor when taken one by one, add up to a more efficient, more economical, and more comfortable ship when taken together. As military vessels become more heavily loaded with detection devices and fire-control apparatus, additional reasons for such stabilization are arising. Another, and by no means minor factor, pointing toward the increased use of stabilization gear, is the fact that during the past decade, the entire art of control has made tremendous strides. For the first time there are large numbers of individuals who can analyze and predict the performance of the

(Concluded on page 458)



### THE TRUE TROPICAL'S COOL WOOL!

Will anything else ever take the place of Fine Tropical Worsteds for a man's Cool, Crisp, Business-Like Suits in warm weather?

Woven zephyr-light to catch every breeze . . . their all-wool content has the body for smart tailoring, the resilience for stubborn wrinkle-resistance and the stamina for years of long, hard wear.

Tropical Worsteds, as hand-tailored in Rogers Peet Suits, include the finest that America and England weave.

Tropical Worsteds Ready for Wearing, or made to Special Order.

*Rogers Peet  
& Company*  
Makers of fine clothes

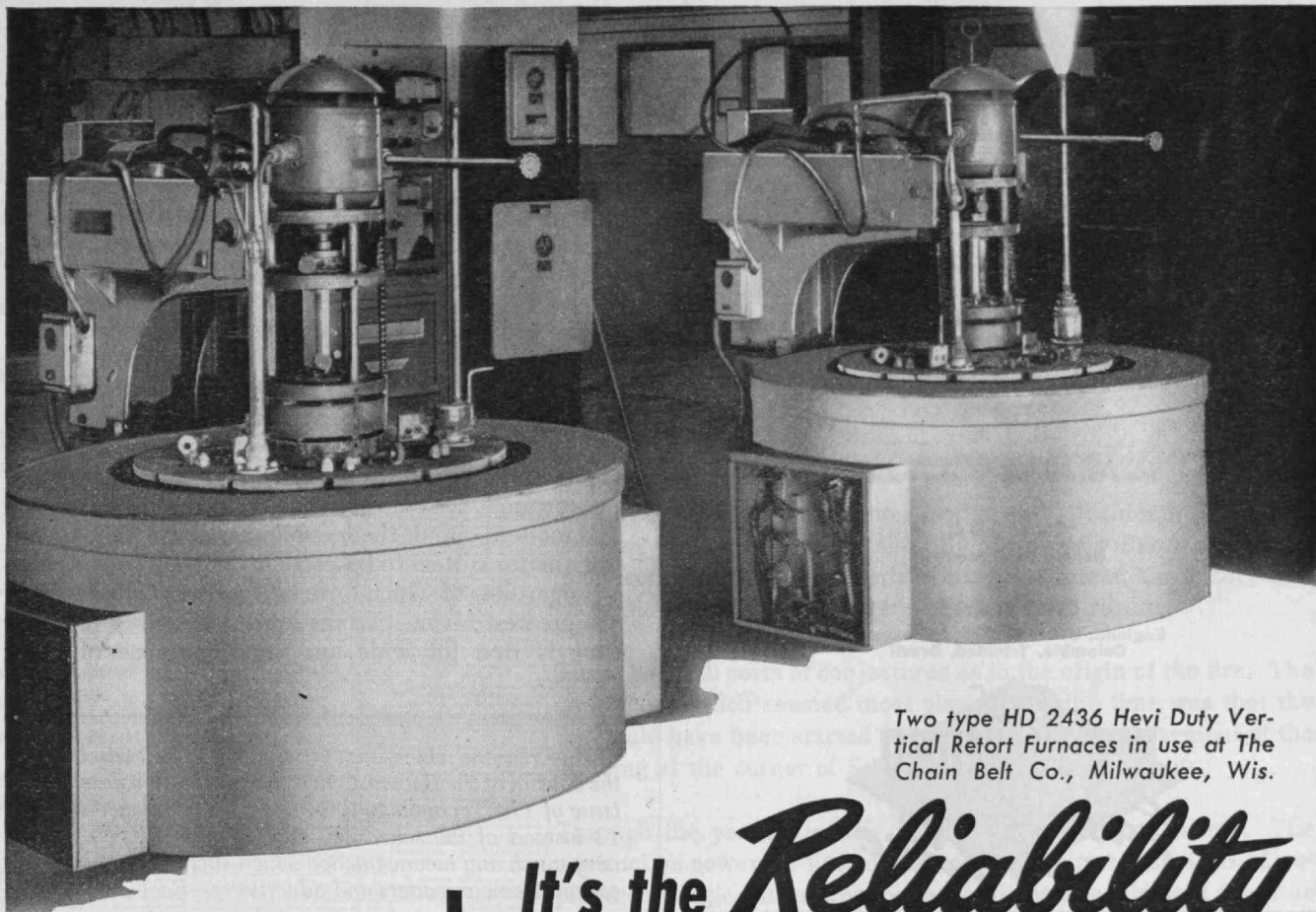
In New York:  
Fifth Avenue  
at 41st Street

Thirteenth St.  
at Broadway

Warren Street  
at Broadway

And in Boston:  
Tremont St.  
at Bromfield St.





Two type HD 2436 Hevi Duty Vertical Retort Furnaces in use at The Chain Belt Co., Milwaukee, Wis.



*is heat-treated in modern*  
**HEVI DUTY FURNACES**

For dependable results that add extra quality to Rex Table Top Chain, each section is case hardened in a Hevi Duty Furnace.

*It's the* **Reliability**  
**of HEVI DUTY FURNACES**  
*that enables you to CUT the COSTS of case hardening parts for your product*

These versatile Hevi Duty Electric Furnaces at the Chain Belt Co., of Milwaukee are in daily use carburizing, hardening, and annealing the many diversified parts used in REX Chains.

Typical of the many heat treated parts are the sections of the popular REX TABLE TOP conveyor chain. Where minimum distortion during heat treatment is a necessity and accurate case depths must be maintained, Hevi Duty Furnaces are first choice.

**Send for Bulletin HD 646**

**HEVI DUTY ELECTRIC COMPANY**


HEAT TREATING FURNACES

**HEVI DUTY**

ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

**MILWAUKEE 1, WISCONSIN**



*Liquid*  
**RED DIAMOND**  
*Gas and Dry Ice*

*[For reasons which are entirely and completely beyond the control of the Review Office, the publication date of this issue of The Technology Review has been delayed to June 13 instead of the scheduled date of May 27. We regret very much any inconvenience which such delay may have caused Review readers and advertisers.—Ed.]*



## FRANK W. HUMPHREY



**56 ELMWOOD STREET, NEWTON 58, MASSACHUSETTS**



## 459

## DO YOU HAVE A PROBLEM

### WHICH WE CAN SOLVE...

with One of Our Braided  
or Plastic Cords?

We manufacture hundreds of kinds of braided cotton cord in all colors and sizes up to one inch diameter — plus many kinds of plastic cords.

Our solid braided cord is highly resistant to wear when running over pulleys or when subjected to abrasion. It is easier to handle than twisted cord, because it is smooth, will not kink, and is easy to tie and untie. The ends will not unravel.

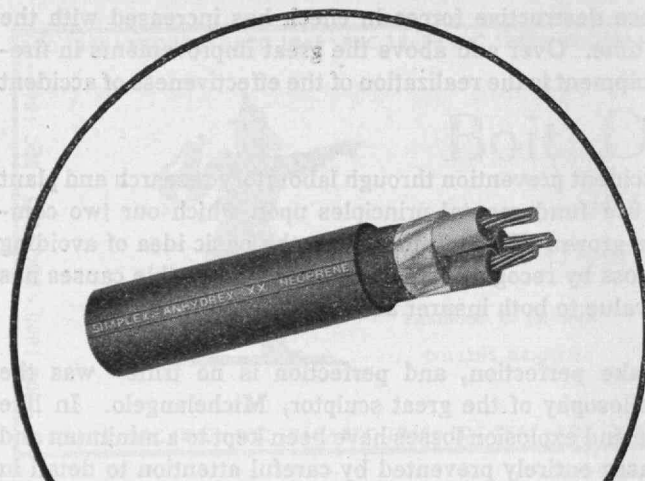
In addition to the usual kinds of solid braided and hollow braided cotton cord, we make specialties, such as wire centre cord, waterproofed cord, special hard or soft cord, cord made of other fibres such as nylon, rayon, etc. and other items in this general field.

• IF YOU HAVE A PROBLEM WHICH MIGHT  
BE SOLVED BY SOMETHING IN OUR LINE  
... WRITE, WIRE, OR TELEPHONE



Reg. U. S. Pat. Off.

**Samson**  
CORDAGE WORKS  
BOSTON, MASS.



## SIMPLEX Anhydrex XX CABLES

High-voltage cables that assure uninterrupted service at 2,000 - 17,000 volts operation in underground, duct, or aerial installations.

Insulated with ANHYDREX XX; first high-voltage insulation combining all the properties necessary for trouble-free operation when exposed to water or moisture, heat, ozone and other deteriorating agents.

Jacketed with neoprene to provide steadfast protection against rough handling, soil acids and alkalis, oils, grease, chemicals and flame.

**SIMPLEX WIRE & CABLE COMPANY**  
79 Sidney Street, Cambridge 39, Mass.

## FEDERATION FOR FREEDOM

(Continued from page 438)

The same consideration applies in the economic sphere. The economic interdependence of the Atlantic democracies has been formally recognized in the European Recovery Program, but this policy, excellent as it is, has attained only a limited degree of coordination among the participants, and it rests on the precarious foundation of the continued willingness and ability of the United States to appropriate immense sums of money for a rather vaguely defined objective. To put the economic relationships of the democracies on a lasting and mutually beneficial footing will require a considerably greater reduction of trade barriers than has yet been achieved, or is likely to be achieved by any group of independent nations, no matter how well disposed they may be toward each other. The present status of the International Trade Organization is illuminating on this point. Everyone agrees that the I.T.O. charter is a fine thing, but nobody will ratify it, even though the alternative may be a return to the catastrophic economic nationalism of the 1920's and 1930's.

Effective economic co-operation can be more readily secured under a federal system, although the problems to be solved are admittedly complicated and difficult. Elaborate structures of tariffs, import quotas, export subsidies, exchange controls, and man-

(Continued on page 462)

## THIS ROPER

IS TYPICAL OF MANY SPECIALIZED MACHINES  
PRODUCED BY US FOR ROPE & ALLIED INDUSTRIES

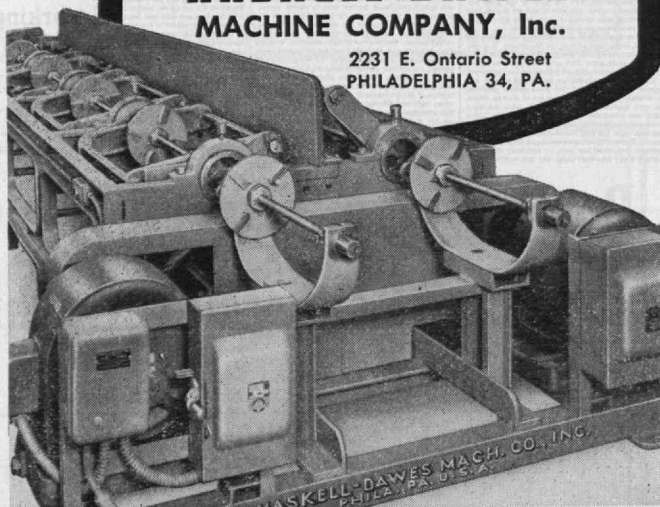
ROPE machinery for hard or soft fibres, synthetics, cotton. • LAYING or CABLING machines for smaller cords and twines. • TWISTERS and FORMERS for yarns, twine, paper, etc.

Based on more than eighty years specialized "know-how" we have contributed many labor-saving innovations to lower production costs, increase profits.

Write Dept. T-2 and we will send you technical bulletins that may suggest ways in which we can help you.

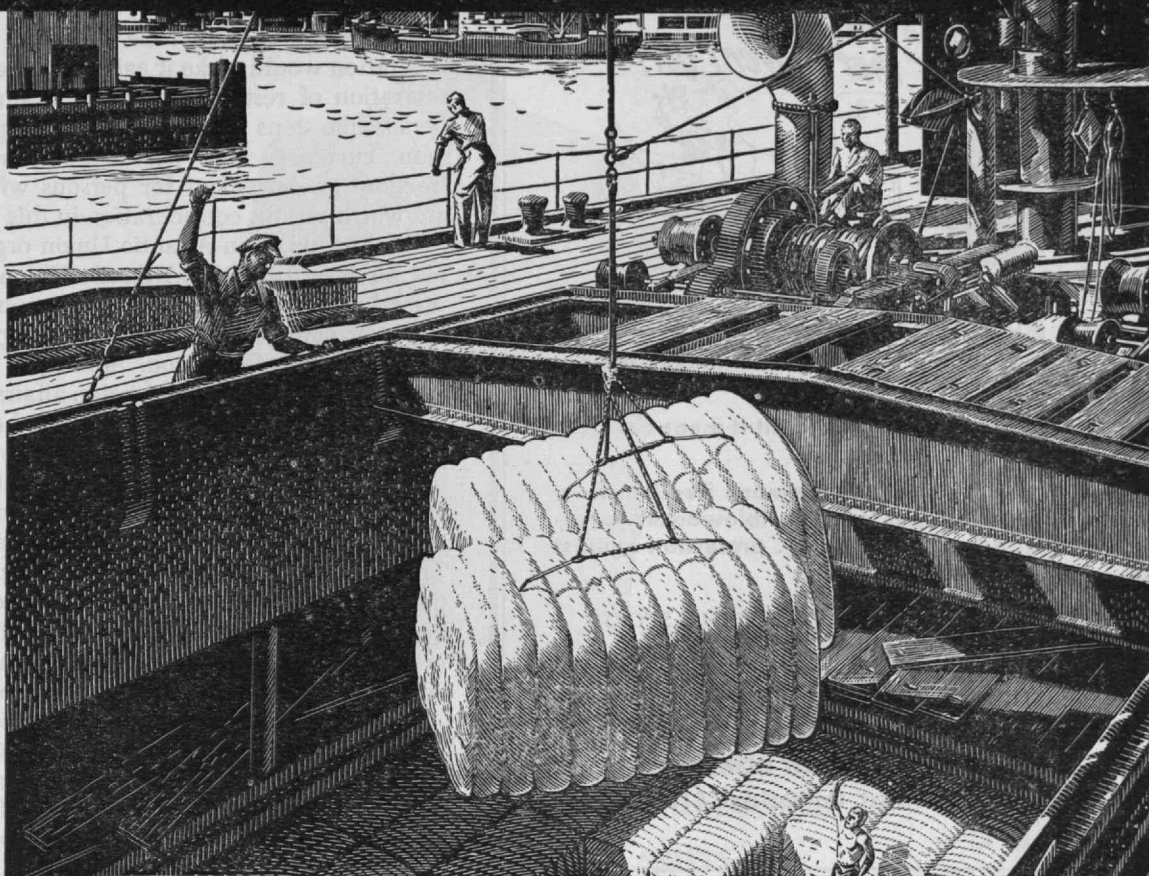
**HASKELL-DAWES**  
MACHINE COMPANY, Inc.

2231 E. Ontario Street  
PHILADELPHIA 34, PA.





# BANKING FOR NEW ENGLAND



## A "Lift" for Your Business

In the wool trade—as in scores of other New England industries—a line of credit is often necessary during seasonal increases in business activity. If your requirements involve immediate working funds to finance expanded inventories—or to carry you over until liquidation of receivables—you should know in advance where, and on what terms, money can be borrowed.

Why not consult us about your credit requirements? A talk with one of our officers will incur no obligation and may prove profitable for you.

### *The* New England Trust Company

135 DEVONSHIRE STREET

*At the Corner of Milk Street*

BACK BAY BRANCH : : 99 NEWBURY STREET

*Boston, Mass.*

*Member Federal Deposit Insurance Corporation*



BANKING FOR  
NEW ENGLAND



**A VENTALARM\* Whistling Tank Fill Signal on her car . . . that's what makes the big difference!**

**For the station attendant it means a care-free fill at full speed.**

**For the car owner it means freedom from all kinds of gas spillage (blowbacks, overfills, and expansion) . . . protection against ugly fender stain.**

**"JUST FILL 'TIL THE WHISTLE STOPS"**

During 1950 over 1,000,000 cars will be factory equipped with VENTALARM Signal.

*Manufactured by*

**SCULLY SIGNAL COMPANY**  
70A First Street, Cambridge 41, Mass.

\*Reg. U.S. Pat. Off.

## C A M B R I D G E



**pH METERS**  
**line-operated — accurate!**

The three models illustrated above incorporate many new and important advantages. All are AC line-operated . . . no battery nuisance. Laboratory and Research models use electron-ray tube for precise null-point indication. Industrial model is a direct-reading instrument, ruggedly built for plant use.

**Accuracy:** Research .02 pH, Laboratory .05 pH, Industrial .10 pH. Other line-operated Cambridge pH equipment includes single- and multi-point indicators and recorders. Send for bulletin 910-MR.

**CAMBRIDGE INSTRUMENT COMPANY, INC.**  
3707 Grand Central Terminal, New York 17, N. Y.  
*Pioneer Manufacturers of*  
**PRECISION INSTRUMENTS**

## FEDERATION FOR FREEDOM

*(Continued from page 460)*

aged currencies cannot be removed overnight, but federation would make it easier to agree on a gradual relaxation of restrictions on trade among the members. Some steps might well be taken promptly; common currency and postal systems and greater freedom of movement for persons within the union are worth serious consideration in this respect.

The details of an Atlantic Union organization cannot be described here. Atlantic Union is not a blueprint for an ideal society; it is a proposal to have a group of nations transform its existing community of interest into a federation. A federal authority with control over military and foreign affairs would appear to be a minimum requirement, but beyond that the precise terms of federation will have to be worked out much as the Constitution of the United States was worked out in 1787, by discussion and compromise until a mutually satisfactory agreement is reached. This much can be said: once the principle of federation is accepted by the people of the democracies, the details will present no insuperable obstacles, and it is fundamental that the Atlantic Union should be adopted by the free assent of the people concerned.

If a union of this kind can be formed, what does it offer? It is not a panacea. It does not offer a foolproof method of preventing war and guaranteeing peace and prosperity. But it can be a powerful deterrent to a Soviet attack on the democratic world, the most likely cause for a third world war. We should be well enough acquainted by now with the ways of totalitarian aggressors to be aware that they strike only when they consider the chances to be in their favor. The prospective members of an Atlantic Union possess an

*(Continued on page 464)*

## GEORGE W. McCREERY CO.

*Building Construction*

126 NEWBURY STREET

BOSTON, MASS.

William H. Coburn, '11

William F. Dean, '17

## William H. Coburn & Co.

INVESTMENT COUNSEL

68 Devonshire St.

Boston, Mass.





**once again...Brooks Brothers lead with the  
most comprehensive selection in America of  
CORDS...PLAIDS...LINEN SUITS  
made exclusively for us on our own patterns**

Our warm weather suits this year are better than ever...and all of them are lightweight, cool and *comfortable*. The excellent selection includes cords, plaids and seersuckers...in all-cotton or new variations of cotton with rayon and nylon...in tan, blue or grey with white.

*Suits, \$18.75 to \$29.75*

*Odd Jackets, \$20 to \$25*

*Odd Trousers in solid colors of a washable fabric, \$12*

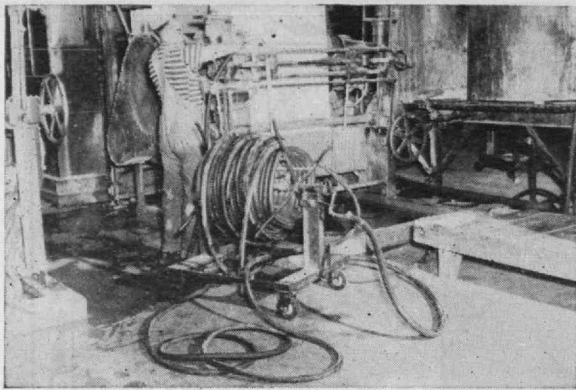
**ESTABLISHED 1818**

*Brooks Brothers,*  
**CLOTHING**  
**Men's Furnishings, Hats & Shoes**

346 MADISON AVENUE, COR. 44TH ST., NEW YORK 17, N. Y.

111 BROADWAY, NEW YORK 6, N. Y.

BOSTON • LOS ANGELES • SAN FRANCISCO



## Condor HOMOFLEX HOSE

### Weighs Less . . . Coils Quicker

It is the most flexible hose construction ever designed. It weighs less per 100' than any other hose for equal working pressure. It does not kink, and coils easily in any direction. The Homoflex construction eliminates the need for thick, stiff hose walls. During vulcanization, the Flexlastics tube and cover join through the cords of the hose wall to make an inseparable unit. Homoflex is perfectly balanced and wears evenly.

Buy Condor Homoflex Hose. It lasts longer and you save money. Available in sizes up to and including 1" inside diameter. Styles for Air, Oil, Water, Suction, Spray and other uses. Write for Bulletin #6879D.



**RAYBESTOS-MANHATTAN, INC.**

MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

**NOW!**

- GENERAL CONTRACTORS
- ROAD CONTRACTORS
- TUNNEL CONTRACTORS
- MINES

**FASTER INSTALLATION  
OF  
TEMPORARY LINES**

FOR WATER, COMPRESSED AIR, etc.

Your exact requirements—packaged complete and ready to go for

**FAST, SIMPLE, IMMEDIATE INSTALLATION**

by one unskilled man with a wrench!

You can RENT or PURCHASE

**SPEED-LAY**

a complete factory-packaged  
**PIPE SYSTEM**

Pipe + Couplings and Fittings + Valves and Accessories  
Already Prepared + Speed-Lay Type + As Required

2 1/2" to 12 1/4" o.d. black or galvanized—Larger sizes can be furnished—LIGHTWEIGHT FOR SAVINGS in Labor and Transportation  
S. G. Albert '29, Treasurer

Write or phone for full information

**IMMEDIATE DELIVERY**

**ALBERT**  
PIPE SUPPLY CO., INC.  
Berry at North 13th Sts., Brooklyn 11, N. Y.  
Phone EVergreen 7-8100

## FEDERATION FOR FREEDOM

(Continued from page 462)

overwhelming preponderance of the world's economic strength, whether it is measured in terms of industrial capacity, access to raw materials, or technical skill. Their military potential, which in our day is largely a product of these economic factors, is great enough to make an attack on them uninviting, provided they do not permit themselves to be picked off piecemeal. The Atlantic Pact reduces this risk; only federation can eliminate it. The democracies, moreover, are free societies. A free society not only has an inherent moral strength that a dictatorship cannot achieve—and moral forces still count for something in this world—but, as Vannevar Bush, '16, has shown in *Modern Arms and Free Men*,† it is much better equipped for scientific and technological advance. No one wants war, but in the present condition of the world it seems just as well to convince the men in the Kremlin that the free peoples can meet force with superior force.

Nevertheless, it would be unfortunate to have Atlantic Union viewed solely as an anti-Soviet combination. The economic strength which would make it formidable in war can be an even greater asset in peace. A stable and prosperous free society offers the best possible foundation for the type of world order we eventually hope to achieve. Tangible evidence that freedom and material well-being have a direct relationship to each other is an unanswerable argument in favor of our way of life. The co-ordination of effort required to reach this goal is not likely to be attained on any terms short of federation.

But is our base too narrow? It is entirely possible that the people who were not invited to be original members of such a federation might interpret and represent their exclusion as discrimination. Against this risk must be set the undesirability of overloading the structure during its formative stages. Of all types of

(Concluded on page 466)

† New York: Simon and Schuster, 1949. \$3.50.

## NORTHEASTERN UNIVERSITY SCHOOL OF LAW

Admits Men and Women

Day and Evening

Bachelor and Master  
of Laws  
Programs

REGISTRATION

September 11-13, 1950

Early application is necessary

47 Mt. Vernon Street  
Boston 8, Massachusetts

Telephone KEnmore 6-5800





**PRECISION-GAUGED  
HAIRSPRINGS  
AND  
FINE ROLLED WIRE**

**PRECISION PRODUCTS COMPANY**

WALTHAM, MASSACHUSETTS

ROBERT I. BRADLEY, '20

**J. C. CORRIGAN CO., INC.**

***Conveyers***

Engineers • Manufacturers • Erectors

Coal Handling Systems

Materials Handling Equipment

Portable Conveyors

*Distributors for*

Jeffrey Manufacturing Co.

Jeffrey Parts Carried in Boston Stock

41 Norwood Street, Boston 22, Mass.

Tel. GENEVA 6-0800

**The TREDENNICK-BILLINGS CO.**

***Construction Managers***

K. W. RICHARDS '07

H. D. BILLINGS '10

C. C. JONES '12

F. J. CONTI '34

10 HIGH STREET

BOSTON, MASSACHUSETTS

***Building Construction***

**HAROLD J. RYAN, INC.**

***Air Conditioning***

101 PARK AVENUE

NEW YORK 17, N. Y.

**Lord Electric Company**

**INCORPORATED**

FOUNDED BY F. W. LORD, M.I.T. '93

**1895**

**ELECTRICAL CONSTRUCTION**

**1950**

131 Clarendon Street  
Boston 16, Massachusetts  
Telephone COMmonwealth 6-0456

10 Rockefeller Plaza  
New York 20, N. Y.  
Telephone CIRCLE 6-8000

1201 Plaza Building  
Pittsburgh 19, Pa.  
Telephone COURT 1920

## JAMES F. DOWNEY & STAFF

INDUSTRIAL ENGINEERS

WORK LOADS, JOB CLASSIFICATION,  
EQUIPMENT UTILIZATION,  
PLANT LAYOUT, PRODUCTION CONTROL  
LABOR RELATIONS

20 NORTH BROADWAY  
WHITE PLAINS, N. Y.

SOUTHERN OFFICE:  
GREENSBORO, N. C.

James F. Downey, '20

*Plans  
Specifications  
Supervision*

*Reports  
Evaluations  
Consultation*

## HOLMES & NARVER

INCORPORATED  
ENGINEERS

824 South Figueroa Street, Los Angeles 14

JAMES T. HOLMES  
M.I.T. '14

D. LEE NARVER  
Stanford '14

## N. A. LOUGEE & COMPANY

ENGINEERS

Successors to J. H. Manning & Company

*Reports—Appraisals—Depreciation Studios  
Rate Cases—Business and Economic Studios*

120 BROADWAY  
N. A. LOUGEE '11

NEW YORK  
L. H. MATTHEWS '13

J. W. McDONALD, JR. '20

## CHARLES N. DEBES

AND ASSOCIATES

*Engineers and Consultants*

Plans, Specifications, Construction Supervision  
Industrial Plant and Commercial Projects  
Electrical — Mechanical — Sanitary — Structural  
ROCKFORD TRUST BLDG. ROCKFORD, ILL.

C. N. DEBES '35

## FEDERATION FOR FREEDOM

(Concluded from page 464)

government, democracy is the most difficult to operate successfully, and a union of democracies will survive only if it is limited to the peoples who have clearly demonstrated their ability to make a democratic system work. The union, indeed, ought to require certain minimum standards of its members — free elections, for example, and something more than paper guarantees of civil liberties. Provision for the admission of new states as they meet these requirements should be made, but premature and indiscriminate expansion would be an invitation to disaster.

On the other side, one can hear the howls of the isolationists, here and elsewhere, about the sacrifice of national sovereignty. It is perhaps enough of an answer to observe that national sovereignty is losing its meaning in a world of jet planes, guided missiles, and atomic bombs. For Americans, at any rate, the idea of federalism ought to be fully consistent with our best national tradition. The purpose of a union of democracies, after all, is to "provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity. . . ."

## LEONARD CONSTRUCTION COMPANY

*Engineers and Contractors*

SINCE 1905

IN THE AMERICAS AND FAR EAST

37 South Wabash Ave.  
Chicago

## SYSKA & HENNESSY, INC.

*Engineers*

Consultation  
Power Plant

Plans  
Water Systems  
Air Conditioning Systems

Reports  
Disposal Plants

NEW YORK, N.Y.

J. F. HENNESSY '24

## PREPARATORY SCHOOLS FOR BOYS

### CHAUNCY HALL SCHOOL

Founded 1828. The School that specializes in the preparation of students for the Massachusetts Institute of Technology.

Ray D. Farnsworth, Principal 553 Boylston Street, Boston, Mass.

### HUNTINGTON SCHOOL FOR BOYS

Grades Nine to Twelve.  
Thorough preparation for entrance to M.I.T.  
and other technical schools.  
Regular and summer courses.  
William G. Wilkinson, Headmaster

320 Huntington Ave., Boston

Tel. Kenmore 1800



# PROFESSIONAL CARDS

## JACKSON & MORELAND

*Engineers and Consultants*

Design and Supervision of Construction  
Reports — Examinations — Appraisals  
Machine Design — Technical Publications

BOSTON

NEW YORK

## DRUMMEY-DUFFILL, INC.

*Architects—Engineers*

80 Boylston Street  
Boston 16, Mass.

WM. W. DRUMMEY, '16, B.S., M.A.,  
A.I.A.

HUGH P. DUFFILL, '20, S.B., S.M.,  
M., Am. Soc. C.E.

## EADIE, FREUND AND CAMPBELL

CONSULTING ENGINEERS

500 FIFTH AVENUE

NEW YORK 18, N. Y.

*Mechanical — Electrical — Sanitary  
Air Conditioning — Power — Process Layouts*

J. K. Campbell, M.I.T. '11

## STARKWEATHER ENGINEERING CO.

INCORPORATED

*Engineers and Contractors for Pumping Plants  
Boiler and Power Plants, Cooling Water  
and Heat Recovery Systems*

246 Walnut Street, Newtonville

BIGelow 8042

J. B. Starkweather, B.S. M.I.T. '21

## THE KULJIAN CORPORATION

1200 North Broad St., Philadelphia 21, Pa.

CONSULTANTS—ENGINEERS—CONSTRUCTORS

*Specialists in*

UTILITY, INDUSTRIAL, AND CHEMICAL FIELDS

*Offices in*

Washington, D.C.—St. Petersburg, Fla.—Rome, Italy

Calcutta, India—Caracas, Venezuela

H. A. KULJIAN, '19

A. H. KULJIAN, '48

## FABRIC RESEARCH LABORATORIES

INCORPORATED

*Research, Development and Consultation  
for Textile and Allied Industries*

665 Boylston Street

Boston, Mass.

W. J. HAMBURGER, '21

K. R. Fox, '40

E. R. KASWELL, '39

## GILBERT ASSOCIATES, INC.

ENGINEERS AND CONSULTANTS

Malcolm G. Davis '25, Vice President Allen W. Reid '12 E. C. Edgar '35

Steam, Hydro, Diesel Power Plants; Industrial Structures;  
Plant Safety, Labor Relations, Utility Rates, Valuations,  
Reports; Large Scale Purchasing; Industrial Laboratory

New York, N. Y.  
Philadelphia, Pa.

Reading, Pa.

Washington, D. C.  
Houston, Tex.

## FAY, SPOFFORD & THORNDIKE

*Engineers*

Airports — Bridges — Water Supply and Sewerage  
Port and Terminal Works — Fire Prevention

INVESTIGATIONS

SUPERVISION OF CONSTRUCTION

DESIGNS

Boston

New York

## CLEVERDON, VARNEY & PIKE

*Consulting Engineers*

HERBERT S. CLEVERDON '10 WALDO F. PIKE '15

Structural Designs

Foundations

Heating Ventilating and Plumbing Designs

Industrial Buildings, Reports, Investigations

120 TREMONT STREET

BOSTON 8, MASS.

## MAURICE A. REIDY

*Consulting Engineer*

BRIDGES

STRUCTURAL DESIGNS

CONSTRUCTION CONSULTANT AND ARCHITECTURAL ENGINEER

BUILDINGS

FOUNDATIONS

*Estimates and Appraisals*

101 TREMONT STREET

BOSTON, MASS.

## THE COSMA LABORATORIES CO.

1545 East 18th Street

Cleveland 14, Ohio

*Chemical Analysis — Testing — Consulting Engineering  
Testimony and Research*

H. SEYMOUR COLTON, M.I.T. '21  
Director

R. W. FRISCHMUTH, Case '32  
Assistant Director

## MORAN, PROCTOR, FREEMAN & MUESER

CONSULTING ENGINEERS

420 LEXINGTON AVENUE

NEW YORK 17, N. Y.

*Foundations for Buildings, Bridges and Dams;  
Tunnels, Bulkheads, Marine Structures, Soil Studies and  
Tests; Reports, Design and Supervision*

Pardo, Proctor, Freeman & Mueser  
Ingenieros Consultores  
Ap. Correos 614, Caracas, Venezuela

WILLIAM H. MUESER, '22

WILLIAM W. RUSSELL '22

EDGAR P. PALMER '25

## PALMER RUSSELL CO., Realtors

1320 Beacon Street

Brookline 46, Massachusetts

COMPLETE MORTGAGE SERVICE

Business Loans to Corporations and Institutions

Loan Correspondent for the Penn Mutual Life Insurance Company

FAirmount 5105

EXpress 7766

## FRANK MASSA

*Electro-Acoustic Consultant*

3393 Dellwood Road

3863 Carnegie Avenue

CLEVELAND, OHIO

# How Bright Is a **SPLINTERING** Fusee?



## You *KNOW* with the new **WESTON** photoelectric light recorder

Rain or shine, fusees must burn—*bright*. Light output, in fact, must conform to rigid specifications. But how to measure it? Sputtering fusees drive conventional light meters all over the scale . . . make accurate readings impossible.

It was to measure—and record—such transient light values that the Weston Photoelectric Light Recorder was developed. This new instrument charts illumination values of various colors as the eye perceives them—thanks to its \*Viscor correction filter. Its \*Photronic photoelectric cell is of the dry disc type made by Weston for over fifteen years. And its \*Celectray recorder, of proved TAG design, follows the sputtering without overshooting or hunting. Full scale values of 20, 40 or 80 foot-candles are selected with a simple switch.

If you need to measure and record—accurately—fast fluctuations in illumination, investigate the Weston Photoelectric Light Recorder.

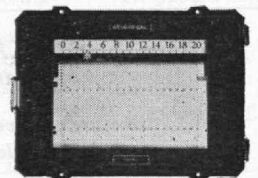
\*Registered Trade Mark

### Here's What This New Instrument Does:

**MEASURES** illumination accurately over a 0-20, 0-40 or 0-80 foot-candle range.

**DUPLICATES** the color response of the average human eye.

**RECORDS** changes in illumination continuously, following rapid fluctuations accurately.



Compact photoelectric cell assembly, left, can be located wherever convenient. The recorder, right, is designed for wall mounting.

## WESTON ELECTRICAL INSTRUMENT CORPORATION

Manufacturers of Tagliabue and Weston Instruments

614 Frelinghuysen Avenue, Newark 5, N. J.





# Alumni AND Officers IN THE News

## Recognition

CHARLES-EDWARD A. WINSLOW'98 was presented with the Lemuel Shattuck Award at the 60th anniversary meeting of the Massachusetts Public Health Association at Boston University on April 25. The newly created award was presented "for distinguished service by a New Englander in promoting public health."

JOHN W. NICKERSON'09 is the recipient of the first annual national Industrial Incentive Award presented "for outstanding contribution to industrial incentives in the United States" by the Society for Advancement of Management and the management division of the American Society of Mechanical Engineers. The presentation was made at a dinner held at the Hotel Statler in New York City on April 20.

The 1950 medal of the Industrial Research Institute, Inc., was presented posthumously to FRANK B. JEWETT'03 on April 26. The medal, which was accepted by Frank B. Jewett, Jr., was awarded "for outstanding accomplishment in the management field of industrial research."

CLARENCE J. LeBEL'26 received the award of the Audio Engineering Society upon completion of his term of office as the Society's president. Mr. LeBel was one of the founders of the Society which was formed in February, 1948, and he was elected president at the first national election of officers in September, 1948.

ROBERT H. BROWN'30 has been chosen by the National Association of Corrosion Engineers to receive the Whitney Award for 1950 "in recognition of his outstanding contributions to the science of corrosion."

ROBERT F. OLWELL'40 was among the winners in the Chicago, Ill., *Tribune's* fourth annual "Better Rooms Competition." Mr. Olwell's designs won first prize in the double bedroom classification and second prize in the living room category.

Among those receiving awards of the Boston Society of Civil Engineers for outstanding papers presented to the Society during the past year were: EDWARD G. LEE'07 who received the Desmond Fitzgerald Award for his paper, "The Proposed Redevelopment of the Water Power of the Connecticut River at Wilder, Vermont"; ROBERT T. COLBURN'23, whose paper, "Headaches from Treatment of Combined Industrial Waste and Sewage," received the award of the Hydraulics section; FRANCIS J. CRANDELL'27, who received the Clemens Herschel Award for a paper entitled, "Ground Vibration due to Blasting and its Effect upon Structures"; and CHARLES H. NORRIS'31, who was awarded the Designers' section prize for his paper, "Localized Buckling of Structural Members."

## Society Doings

Various gatherings of Alumni and staff members took place during the divided national spring meeting of the American Chemical Society held in Houston, Philadelphia and Detroit during April. One such gathering on April 17 at the Hotel Tuller in Detroit included the following: M. D. BANUS'44, V; P. M. BERNAYS'39, V; C. R. BRADGON'07, X; CLAUDE CORTY'44, X; W. M. CREASY, JR., '36, X-A; J. B. DAVIDSON'42, V; M. A. EITELMAN'33, V; C. T. ELLIS'17, X; H. G. FLETCHER, JR., '39, V; LEWIS HESS'29, X; N. C. HILL'26, X; E. W. HOLROYD, JR., '47, V; E. H. HUNTRESS'20, V; JOSEPH IRGON'48, V; D. M. KNOTT'41, V; A. A. MORTON'24, V; H. A. NEWEY'41, V; J. W. PERRY'31, X; S. F. RADTKE'40, XV; P. H. RICHARDSON'30; W. B. STEVENS'35, X; H. C. WOHLERS'40, V; W. C. WOODING, JR., '34, X; R. C. YOUNG'29, V; E. A. HAUSER, staff; L. J. HEIDT, staff; ALLEN SCATTERGOOD, staff. Papers presented at the technical sessions of the Detroit meeting included: E. A. HAUSER, staff, "Modern Colloid Chemical Concepts of the Phenomenon of Coagulation"; L. J. HEIDT, staff, and F. W. SOUTHAM, staff, "The Hydrolysis of Sucrose by Hydrochloric Acid"; L. J. HEIDT, staff, and BARBARA F. VAN TASSEL'48, "The Hydrolysis of L-Arabinosides by Hydrochloric Acid"; E. H. HUNTRESS'20, "The Influence of Nomenclatural Evolution upon Comprehensive Literature Searches"; R. C. HOCKETT, staff, V. B. JEX, staff, and ALLEN SCATTERGOOD, staff, "Dicyclohexylidene-D-Fructose and Derivatives"; W. H. STOCKMAYER'35, "Molecular Weight Distributions and Averages"; R. C. YOUNG'29 and E. W. GOLIBERSUCH'48, "Columbium and Tantalum in an Oxidation State of Three."

## By-lines

CLAUDE E. PATCH'02 is the author of the article, "Use of Charts in Operation Studies," which appeared in the March, 1950, issue of *The Paper Industry*.

JAMES K. CAMPBELL'11 wrote "Heating and Ventilating a Bus Garage and Repair Shops" which was published in the March, 1950, issue of *Heating and Ventilating*.

AUSTIN R. FREY'20 and Lawrence E. Kinsler are the coauthors of *Fundamentals of Acoustics*, published by John Wiley and Sons, Inc., 1950.

CLIFFORD L. ALDERMAN'25 has written a new historical novel, *The Arch of Stars*, published by Appleton-Century-Crofts, Inc., May, 1950.

JOHN W. NORRIS'27 penned *Warm Air Heating and Winter Air Conditioning*, published by the McGraw-Hill Book Company, 1950.

ANTHONY STANDEN'29 has written *Science Is a Sacred Cow*, published by E. P. Dutton and Company, Inc.

EDWARD W. KIMBARK'33 is the author of *Electrical Transmission of Power and Signals*, published by John Wiley and Sons, Inc., 1949.

A. WILSON NOBLE'47 and PETER J. WESTERVELT'47 are the coauthors of the article, "A Resonant Bar Method for Determining the Elastic Properties of Thin Lamina," which appeared in the April, 1950, issue of the *Journal of Applied Physics*, Volume 21.

CHARLES A. DOMENICALI'49 is the author of the article, "A Null-Coil Pendulum Magnetometer," printed in the April, 1950, issue of *The Review of Scientific Instruments*, Volume 21, Number 4.

DOUGLAS P. ADAMS, staff, is the editor of a new reference book, *An Index of Nomograms*, published jointly by John Wiley and Sons, Inc., and the Technology Press. March, 1950.

FRANCIS BITTER, staff, wrote *Nuclear Physics*, published by Addison-Wesley Press, Inc. April, 1950.

ELTING E. MORISON, staff, is the author of "A Case Study of Innovation," an article that appeared in the April, 1950, issue of *Engineering and Science Monthly*.

VERNON D. TATE, staff, is the editor of *American Documentation*, a quarterly magazine published by the American Documentation Institute, Inc. J. WHITNEY PERRY'31 is an associate editor of this publication.

## Spoken Words

WARREN K. LEWIS'05 spoke at a meeting of the New England district of the American Society for Testing Materials held at Northeastern University on April 10. Dr. Lewis' topic was, "Competitive Sources of Energy."

HUDSON B. HASTINGS'07 spoke on the "Yale Interprets the News" program over Station WTIC on April 30. Professor Hastings discussed the need for improvement in human relations in industry.

MURRAY P. HORWOOD'16 presented a paper on "Sixty Years of Progress in Sanitation" before the 60th anniversary meeting of the Massachusetts Public Health Association on April 25.

LESLIE R. GROVES'17 discussed "Military Aspects of Atomic Energy" as the featured speaker at a meeting held in conjunction with the Newark, N. J., Atomic Energy Week programs presented during March.

THOMAS P. COOGAN'24 was the principal speaker at the 4th annual convention banquet of the Home Builders Association of Rhode Island held on May 11 in Providence, R. I.

RALPH M. EVANS'28 was the speaker at a combined meeting of the Philadelphia section, American Association of Textile Chemists and Colorists and the Philadelphia-Wilmington Color Group on May 5. His talk was entitled, "Seeing Light and Color."

SCOTT B. RITCHIE'31 was the principal speaker at an April meeting of the Birmingham chapter, Society for Advancement of Management. Mr. Ritchie discussed "The Human Angle in Managing."

RICHARD S. MORSE'33 spoke on "Research as a Business" at a meeting of the Advertising Club of Boston held on April 25.

MONROE R. BROWN'42 was one of the speakers before the 6th annual forum of the American Helicopter Society held on March 30 and 31 in Philadelphia, Pa. The subject of Mr. Brown's talk was, "A Current Report on the New York Helicopter Case."

ARTHUR T. IPPEN, staff, spoke on "Hydraulic Research at M.I.T." at a meeting of the Hydraulic section of the Boston Society of Civil Engineers held on May 3.

VICTOR F. WEISSKOPF, staff, and Samuel K. Allison discussed "Is Scientific Secrecy Necessary?" on the "Adventures in Science" program broadcast over the Columbia Broadcasting System on April 29.

## C.F.D. Meeting

The 3d national meeting of the Committee on Financing Development took place at the Institute on April 22. MARSHALL B. DALTON'15, chairman of the committee, presided at the morning assembly and the luncheon and dinner meetings.

Reports were made during the assembly by the following Alumni: Region I, RAYMOND STEVENS'17; Region II, DUNCAN R. LINSLEY'22; Region III, WALTER J. BEADLE'17; Region IV, HOWARD H. MCCLINTIC, JR.'19; Region V, LOUIS H. G. BOUSCAREN'04; Region VI, WILLIAM J. SHERRY'21; Region VII, WILLIAM L. STEWART, JR.'23. A special gifts report was given by Mr. Dalton. THOMAS D'ARCY BROPHY'16 addressed the assembly on "The Public Relations Value to M.I.T. of the Development Program." RALPH T. JOPE'28 spoke on "Individual Solicitation," PAUL RYAN'22 spoke on "Corporation Solicitation and Procedures," and ROBERT E. WILSON'16 discussed "Grants from Corporations."

President JAMES R. KILLIAN, JR.'26 gave an illustrated address on new and projected buildings at M.I.T. at the luncheon meeting, and WARREN K. LEWIS'05 discussed the co-operation between M.I.T. and industry in research. The dinner speakers included HORACE S. FORD, KARL T. COMPTON and President KILLIAN.

## Edwin S. Webster

EDWIN S. WEBSTER'88, Life Member and member of the Executive Committee of the M.I.T. Corporation, died on May 10 at his home in Chestnut Hill, Mass., after a brief illness. Mr. Webster was co-founder, with the late Charles A. Stone'88, of Stone and Webster, Inc., engineering firm of Boston, Chicago and New York. In 1909, he was elected president of the Alumni Association. He was a member of the Site Committee at the time the Institute was moved from Boylston Street in Boston to Cambridge, and was president of his class at the time of his decease. Northeastern University conferred the honorary degree of LL.D. upon him in 1936.

Born on August 26, 1867, he was the son of Frank G. and Mary (Messinger) Webster. He married the former Jane de Peyster Hovey on June 1, 1893. He was a member of the American Institute of Electrical Engineers, the Boston Society of Civil Engineers and the American Electrochemical Society. He also held many directorships and was an active clubman. Mr. Webster is survived by his wife and three children.

## Obituary

JAMES H. TIBBITS'79, January 1, 1948.  
EMIL H. FROMMANN'82, March 17.  
REDINGTON FISKE'85, April 1.\*  
HARRY W. CLARK'87, March 16.  
WILLIAM ATKINSON'88, April 21.  
EDWIN S. WEBSTER'88, May 10.  
FRED A. CROSSMAN'90, September 21, 1949.†  
ALBION L. PAGE'90, April 16, 1949.†  
LYMAN O. WARREN'90, in March, 1949.†  
FRANCIS C. HOLMES'91, March 12.†  
ROBERT M. PIERCE'91, August 28, 1949.  
ARTHUR W. CLOCHER'93, June 23, 1940.  
WALTER U. GUTMANN'93, March 29, 1949.  
FRED L. VARNEY'93, February 28.  
FRANK DRAKE'94, January 14.†  
DANIEL W. RICHARDS'94, November 8, 1947.†  
BENJAMIN ADAMS'95, March 3.†  
ROBERT W. SWIFT'95, March 9.†  
WILLARD H. COLMAN'96, September 3, 1949.†  
NATHAN H. DANIELS'96, March 2.  
THOMAS MCGLYNN'96, November 26, 1949.  
ESTHER STONE'96, February 22.\*  
JAMES TALBOT'96, March 4, 1949.\*  
FRANK H. CARTER'97, December 27, 1940.  
EDWARD R. HEISSLER'97, January 18.\*  
ALBERT P. NORRIS'97, March 29.\*  
FRANK E. COOMBS'98, September 9, 1948.  
ROBERT M. DRAPER'98, February 18.†  
JOHN H. LAMBERT'98, September 10, 1949.†  
HENRY R. ROBINSON'98, January 24.  
REGINALD S. TOBEY'98, January 28.†  
WILBERT C. TANDY'99, September 12, 1949.†

PHILIP R. FRENCH'00, March 9.\*  
PHILIP L. GRABAU'00, August 26, 1946.†  
MRS. MARGARET STANNARD'00, October 30, 1949.†  
ALBERT N. KLYVER'01, November 15, 1949.\*  
EDWARD C. THATCHER'01, February 16.\*  
WILLIAM BARBER'02, January 21.  
ALBERT HAMILTON'03, date unknown.  
ARTHUR P. RICE'03, December 14, 1949.  
HENRY K. CHAPIN'04, January 7, 1946.  
FREEMAN A. COBB'04, April 12.  
WILLIAM A. HYDE'04, April 27.  
JOHN F. DUNN'05, in January, 1950.\*  
IDA A. RYAN'05, February 17.†  
IDA A. STONE'05, July 8, 1947.  
HARRY H. WEST'05, August 17, 1949.†  
CARL F. EDWARDS'06, in 1948.  
CARL F. NORTHRUP'06, March 24.  
KILLEY E. TERRY, JR.'06, April 1.  
JULIUS W. WALTER, JR.'06, December 4, 1948.  
RALPH N. HALL'07, January 13.†  
RODNEY C. CARYL'08, December 17, 1949.†  
GERALD T. HANLEY'08, March 13.  
WALTER E. POOR'08, April 4.  
LINCOLN R. SOULE'08, January 31.†  
JAMES S. GROFF'09, April 5.  
MERLE RANDALL'12, March 17.\*  
WILLIAM V. KEMP'13, March 17, 1948.  
CHESTER R. GARDNER'14, April 11.  
DON M. KELLY'14, August 15, 1949.  
WILLIAM H. GABELER'15, April 29.  
CHARLES F. HORAN'16, March 8.\*  
ALEXANDER KLEMIN'16, March 13.†  
STEPHEN J. MARKHAM, JR.'17, April 19.  
BENJAMIN S. WELLS'17, April 26.  
EDWARD J. SCANNELL'18, April 11.  
ARTHUR E. GRIFFIN'19, February 25.\*  
JOSEPH S. GELDERS'20, March 1.\*  
FRED E. PELTON'20, July 7, 1948.\*  
W. PORTER PRATT'20, in August, 1948.\*  
DUSTIN G. CRESSY'21, in July, 1941.\*  
JOHN D. CROWLEY'21, February 27.\*  
MAXWELL MURRAY'21, August 4, 1948.†  
S. EASTMAN ROOT'21, March 12.\*  
J. ROSS ALLEN'22, April 20.  
WILLIAM E. DALEY'22, February 1.†  
CORNELIUS E. HARRINGTON'23, May 14, 1949.\*  
FRANK R. HASSLER'23, January 31.†  
EDWARD B. MAYNARD'23, March 17.  
MICHAEL J. P. PATTIS'23, February 13, 1947.\*  
BRESEE J. STEVENS'23, March 1.†  
EARL M. EDGERTON'25, March 26.  
CALVIN H. OWENS'25, December 18, 1949.  
ELMER P. RIPATTE'25, April 23.  
LUCIEN J. DRAPEAU'26, November 21, 1949.  
B. E. MORRIS'26, November 21, 1949.  
JOSEPH W. HAMMOND'27, April 19.  
RALPH P. ROBINSON'27, December 18, 1949.†  
PAUL C. SPRINGER'27, March 6.†  
PAUL KEOUGH'30, September 6, 1949.†  
ALBERT H. WEHE'31, October 16, 1949.  
AUBREY L. MCCAFFREY'32, June 6, 1949.  
JOHN S. FERNALD'35, September 22, 1948.  
FRANCIS A. PETERS'36, date unknown.  
JOHN L. LARSON'42, December 17, 1949.  
WILLIAM D. STROUD, JR., 6-45, April 9.  
JAMES H. BURRELL, JR.'48, in November, 1949.

†Mentioned in May class notes.

\*Mentioned in June class notes.



# News FROM THE Clubs AND Classes

## CLUB NOTES

### *The M.I.T. Club of Buffalo*

Local M.I.T. men gathered on March 20 at the University Club in Buffalo to hear Ralph T. Jope'28 of the Institute, and to see the movie "M.I.T. at the Mid-Century." This was in connection with the M.I.T. Development Program and it is felt that a most successful meeting was held. Although a trifle earlier than in past years, it was thought that this meeting would be a good opportunity to elect directors. Consequently, Joseph M. Bray'40, Alfred M. Bretschger'48, and Harold D. Mitchell'12 were added to the board of directors.

Among those present were: Eugene Ashley'48, Joseph A. Bergantz'41, Walter W. Bird'34, Robert L. Black'45, George J. Chambers'12, William O. Christy'31, Henry F. Daley, Jr.'47, Paul A. Davis'31, Mario S. DiQuilio'48, Richard E. Dow'01, Michael A. Eitelman'33, Whitworth Ferguson'22, James M. W. Field'47, Daniel J. Fink'48, Herman E. Gabel, Jr.'41, J. Harold Genrich'31, Weston W. Goodnow'46, C. Mallory Graves'36, Edward W. Habicht'44, Carl H. Haushalter'47, Edward J. Hayes'50, John M. Hendrick'42, Louis P. Holladay, 3d'34, Frederick F. House'36, Lester F. Hoyt'13, Emmette F. Izard'29, Arthur E. Karnuth'43, John H. Keefe, Jr.'47, Alan W. Ker'47, Edward L. Klopfer'44, Christian Kurtzmann'09, Benjamin F. Lapp'15, Herbert Lauterbach'49, Robert G. Loewy'48, Charles E. Lowe'49, George W. Mahlman'48, John Mechta'49, Warren H. Miller'45, Daniel C. Mitchell'34, Harold D. Mitchell'12, James F. Patterson'36, Philip S. Perch'47, R. I. Reis'48, Joseph R. Ryan'31, Paul R. Schlehr'50, Walter H. Sherry'37, Mitchell B. Smilo'49, Douglas J. Taylor'39, Stanley A. Tirrell'41, Robert A. Veitch'44, David W. Whitcomb'42, Jesse L. Wilson'41. — MATTHEW N. HAYES'36, *Secretary*, 653 Linwood Avenue, Buffalo, N.Y.

### *M.I.T. Club of Mexico City*

At this year's "general reunion" we had three visiting guests of honor: H. E. Lobdell'17, Executive Vice-president of the Alumni Association; John D. Fitch'24, Chief of Engineering Division of the Export-Import Bank and Robert H. Winters'33, Minister of National Resources and Development of Canada. The program began on March 9 with a luncheon for M.I.T. club members at the University Club of Mexico City, followed in the afternoon by a reception given at the Embassy residence of The Honorable Walter Thurston,

United States Ambassador. In the evening, through the courtesy of José de Martino'26, some of the members and their wives attended the jai alai games.

On the evening of the 10th, a reception and banquet with an attendance of 105 took place, with T. M. (Jack) Nevin'24, our Club President, as toastmaster, introducing the following speakers: Messrs. Lobdell, Fitch, Winters and Thurston and The Honorable Charles Hébert, Canadian Ambassador to Mexico, Douglas Cole, Commercial Counsellor of the Canadian Embassy, and The Honorable Adolfo Oribe de Alba, Secretary of Hydraulic Resources of Mexico. The latter welcomed the visitors on behalf of President Aléman's Administration. The next day all the papers headlined reports of the dinner giving special emphasis to Johnny Fitch's speech, following which many members realized that instead of asking Santa Claus for Christmas presents, they should write to Johnny Fitch of the Export-Import Bank.

The following Alumni were present at the dinner on March 10: Pedro Albin'47, Edwin Anisz'42, George D. Camp'16, Clarence M. Cornish'24, Fidencio Cortes'43, Enrique Curiel - Benfield'43, Lyman Chandler'31, Gonzalo Garita'16, Manuel A. Hernández'13, G. A. Joslin'09, Salvador Madero, Jr.'29, Alvino Manzanilla'31, Fernando Martínez Gallardo'35, José de Martino'26, Angel P. Moyano'28, Arturo Morales'44, José Murga Dávalo'32, Thomas M. Nevin'24, Juan de Noriega'23, Héctor M. Orozco'45, Felipe Pescador'45, Richard Plummer'26, Rodolfo Rosas'33, Raúl Sada'49, Javier Sada Narro'47, Jorge Sanchez Aguilar'46, Agustín Valdés'25, Carlos Ziegler'32, Leonardo W. Zeveaert'40, Scipio de Kanter'44; and also Ramón F. Muñoz'09 from Monterrey, Thomas H. Jenkins'32 from Houston, Haskins B. Canfield'22 from Cambridge, and Harold C. Pearson'23 from Montreal.

On Saturday, March 11, we had a cocktail-buffet at the home of Gus Valdes'25 with the attendance of almost everybody from the night before. We had one of the most prominent girl singers of typical Mexican songs, Irma Vila and her "Charro Band" and other entertainers that made this party a great one.

The next day Technology Associates de México, a recently incorporated consulting firm composed exclusively of M.I.T. Alumni, offered a luncheon to Lobby and in the afternoon all attended the bull fight at the Plaza Mexico. Monday, we realized that Lobby was too tired to do anything so he rested the whole day to be ready to leave on Tuesday for Mérida with Ramón Muñoz, Tom Jenkins and Wiley Millyard of the Canadian Embassy. At Mérida they were entertained by A. Ponce Cantón'22 and Lorenzo Manzanilla'31, who took them to Progreso, the Mayan ruins at Uxmal and Chichen Itzá. — AGUSTIN VALDES'25, *Secretary*, Montanas Calizas 720, Esq.

Av. Palmas, Lomas, Mexico City, D.F., Mexico.

### *M.I.T. Club of Monterrey*

The Club held a monthly meeting at the Casino Monterrey on the night of April 21. Commodore Carroll'17 spoke on the interesting subject of "Sound Decision," which was very much welcomed and enjoyed by all the listeners.

The Club was honored by the presence of Dr. H. Hubbard, President of the Association of Southern Universities; Dr. Lloyd Chapin, Dean, Georgia Institute of Technology; Dr. J. M. Godard, Secretary of the Association; Dr. Wolsey, Professor of Languages of the Texas College for Women, Denton, Texas. Our guests are visiting Monterrey to investigate the scholastic standing of the Instituto Tecnológico de Monterrey in connection with its application to enter the Association of Southern Universities. Also attending, from the Instituto Tecnológico, were Ing. Victor Bravo Ahuja, General Secretary; Commodore Penn L. Carroll; Hon. Lic. Sergio F. de la Garza; and Ing. Pablo H. Hope.

Members present were: R. E. Valentine'23, Bruce Duffett'40, Frank M. Corliss'25, Hernán Rocha'48, Manuel Llaguno'46, Alberto P. González'01, Juan Celada'44, Eliot Camarena'44, Julio de la Fuente'33, Lauro Martinez Carranza'20, Penn L. Carroll'17, and Ramón F. Muñoz'09. — BERNARDO ELOSUA'23, *Secretary*, Box 360, Monterrey, N.L., Mexico.

### *The M.I.T. Club of New York*

A club dance to celebrate spring and the beginning of the baseball season held the attention of New York Alumni on April 14. Nearly 100 younger Alumni, their wives and guests attended the dance and greatly outnumbered the older members. But that can be explained mathematically. It has nothing to do with our age or agility.

Expenses of the party were paid for by finding "Sponsors" among the older classes. Alumni out of M.I.T. one or two years receive free membership and pay no dues. Consequently, Alumni of the classes of 1948 and 1949 were all set for a free dance. John Plantinga'45 was chairman of the spring dance committee. Lou Bruneau'38 deserves the tin medal for "selling" enough Sponsor tickets at \$10 apiece to cover the costs.

Daily luncheons at the M.I.T. table at the club address, 115 East 40th Street, continue to be well attended. Jim Nealey'11 is there two or three luncheons a week, putting fellows looking for positions in touch with concerns looking for M.I.T. graduates. — G. P. GRANT, JR.'35, *Secretary*, Grant Photo Products, Inc., 401 Broadway, New York, N.Y.

## Niagara Falls M.I.T. Club

The spring meeting of the Club was held on March 21. Our guest and speaker of the evening was Ralph T. Jope'28 who presented an interesting talk on the development program at M.I.T. Following Mr. Jope's address, the group enjoyed the film showing the 1949 convocation.

Those attending were: Arnold Arch'40, Marshall E. Baker'48, Paul B. Brown'23, L. F. Cavendish, Jr.'38, Edward Depoyan'30, W. T. Dunlap, Jr.'22, C. Arnold Dutton'23, Burnham E. Field'15, Edward C. Forbes'41, William H. Hope, Jr.'36, Edward D. Kane'47, Robert C. Kennedy'32, Judge McLaughlin'48, Harry S. Myers, Jr.'44, Eliot W. Reynolds'42, Samuel H. Reynolds'22, Chester N. Richardson'16, Gordon D. Shingleton'49, Lester M. White'12 and James Woodburn, Jr.'46. — JOHN J. SEAMAN'35, *Secretary*, 8234 Witkop Avenue, Niagara Falls, N.Y.

## M.I.T. Club of Philadelphia

Joseph K. Knight'40 has moved out of our area. Herbert R. Moody'41 replaces him on the executive committee. A. Abba Orlinger'21 resigned from Sharp and Dohme, Inc., after 11 years' service as their patent counsel. He has resumed the private practice of patent law in both Philadelphia and New York. Our Club President, Robert E. Worden'36, always seems to find the time and energy to take on more duties. Recently, Bob headed the industrial division of the Red Cross fund drive in Philadelphia. Currently, he is secretary of the Class of 1936.

The M.I.T. Regional Scholarship Committee, headed by Greville Haslam'15, met on April 27 for the purpose of interviewing a number of selected candidates. Details on this meeting will be available for the next issue of The Review as will the report on the May meeting at the Barclay Hotel. It is our special pleasure to announce the marriage of Miriam Elizabeth Duble to George E. Bierce, Jr.'47 on April 15 at Collingswood, N. J. Mr. Bierce is employed by the New Jersey Bell Telephone Company. — SAMUEL K. MCCAULEY'41, *Secretary*, 288 Copley Road, Upper Darby, Pa. *Assistant Secretaries*: WILEY F. CORL, JR.'39, Box 532, Bryn Mawr, Pa.; PROCTOR WETHERILL'34, Rural Delivery, Chester Springs, Pa.

## M.I.T. Club of Schenectady

Most members of the Club have been occupied with the Alumni drive during the past few months. Various committees are operating throughout the Schenectady area and outlying territories explaining the purposes behind the drive and presenting the M.I.T. story to all Alumni. All of our members have been enthusiastic in this program.

A luncheon meeting of the Club was held on March 22 in the Schenectady Young Women's Christian Association Building. As a change from the usual luncheon speaker, the General Electric Company movie, "Clean Waters," was shown to the group. The movie deals with municipal and state programs throughout the country for conservation and clean-up

of water supplies. An interesting discussion followed.

Present were: Francis Brown, Jr.'48, A. M. Varner'47, J. F. Robertson, Jr.'47, K. P. Coachman'22, P. M. Currier'14, P. L. Alger'15, C. F. Barrett, Jr.'34, J. S. Quill'41, L. H. Dee'35, G. M. Ketchum'41, J. H. MacLeod, Jr.'41, E. H. Bancker'18 — WILL B. RODEMANN'44, *Secretary*, General Electric Company, Building 81, Schenectady 5, N.Y.

## M.I.T. Club of Southern California

The 1950 directory is off to a very good start, with three meetings held at the home of Bud Golsan, Jr.'34, at 1820 Diamond Avenue, South Pasadena; telephone, Albany 8451. The emphasis this year will be on securing a large number of advance subscriptions at \$1 each. The directory will include the names and local addresses of all students from this area now going to M.I.T., and dues have already been received from two of these who expect to graduate this June. This active support from prospective new members is appreciated. The present members of the Directory Committee, to which additions may be made later for editorial and other purposes, are: Hakala'35, Golsan'34, Beebe'10, Morton'13, Row'23, Sutton'43, Navas'32, McDowell'45, Strauss'38, Dingler'48, Powers'26, Shoemaker'29 and Cunningham'27. With the aid of the Development Campaign list, card files were set up, both alphabetically and by classes, and it is hoped to secure a member from each class who will act as local secretary and whose name will appear in the directory as such.

These three meetings were also of great value in planning the trip to Fontana Steel on May 23 and 24, under direction of Naughten'23, head of public safety at Fontana Steel. An advance trip was taken to Fontana Steel by Row'23, Shoemaker'29 and Beebe'10 to inspect the plant and the various facilities for taking care of the crowd, which totaled 250 persons per evening including ladies and children of 12 years and over. Powers'26 is also working on a future trip through Alcoa in Vernon. Evidently, there will be a very large increase in the number of Alumni present at the meetings.

A pleasant visit is acknowledged by the Secretary from William V. Schmiedeke'12 of the Penker Construction Company of Cincinnati, Ohio. In addition to a visit to his mother, Schmiedeke gave some interesting facts in regard to the M.I.T. Club of Cincinnati which might be used in this area. — On April 15, a request for information as to address and telephone — both business and residence — went out for compilation into the 1950 directory which is well on its way. If any reader living in this area has not received this letter, contact should be made with the Secretary at once. — HIRAM E. BEEBE'10, *Secretary*, 1847 North Wilcox Avenue, Hollywood 28, Calif.

## Washington Society of the M.I.T.

The Society's Ladies' Night was held at the Willard Hotel on April 13. "Progress in Better Living" was the subject

of the address delivered by Louis P. Shannon of the Du Pont Company. Earle S. Bates'24 presented the slate of nominees for next year's management.

Mr. Shannon's talk was entertaining and highly informative. Woven around Du Pont products such as nylon, neoprene and orlon, the speech was a serious bid for support of big business by the public. The speaker showed that only with vast research expenditures could synthetic products like those mentioned be made. Low prices for these products necessitate costly manufacturing plants. Small business has no place in this sort of research and manufacturing game, but small business has a large place in turning nylon, neoprene and other Du Pont materials into consumer goods. Mr. Shannon urged that public support of big business be encouraged by ameliorating existing government regulations where possible, buying securities, and using products.

Present were: K. P. Armstrong'10, E. S. Bates'24, H. M. Baxter'17, A. D. Beidelman'15, A. E. Beitzell'28, A. C. Benjes, Jr.'49, A. F. Bird'30, M. J. Block'41, R. C. Burrus'22, S. J. Cole'26, F. H. Copeland'18, J. G. Crane'90, C. B. Devey'46, E. W. Glen'29, M. H. Gluntz'35, A. M. Holcombe'04, G. R. Hopkins'22, E. M. Kenyon, Jr.'42, L. M. Klashman'37, L. F. Kreek'25, T. C. Lu'44, F. D. McKeon'26, W. K. MacMahon'22, H. W. Mahr'07, G. E. Marsh'01, C. D. Mock'28, E. L. Morse'22, W. G. Peck'40, A. M. Pedersen'12, W. H. Phillips'28, J. A. Plugge'29, L. H. Roosa'49, J. W. Sheetz'42, C. C. Smith'28, M. P. Smith'19, M. O. Soroka'26, J. H. Sprague, Jr.'43, N. P. Stathis'29, C. R. Stempf'42, G. W. Stone'89, H. H. Thompson'13, R. K. Thulman'22, F. P. Upton'16, William Wallace, Jr.'48, H. F. Ware'25, T. C. Warner, Jr.'47, R. B. Warren'22, G. L. Washington'25, M. E. Weaver'05, A. R. Williams'17, H. S. Yoder, Jr.'48, A. G. Zahka'29. — JOHN ADE PLUGGE'29, *Secretary*, 35 Oxford Street, Chevy Chase 15, Md. ALBERT F. BIRD'30, *Review Secretary*, 5070 Temple Hills Road, Southeast, Washington 20, D. C. JOHN W. SHEETZ'42, *Assistant Review Secretary*, 3068 South Woodrow Street, Arlington, Va.

## The M.I.T. Club of Western Pennsylvania

The Club held its regular monthly meeting at the University Club in Pittsburgh on March 15. After a pleasant hour of informal conversation and the stein, an excellent buffet dinner was served. At 8:00 P.M. the meeting was called to order by our President, George Hoffman'28. The minutes of the February meeting were read and approved. The treasurer's report was read by Treasurer Charlie Peck'41 and approved. The guests and new members were introduced. At this meeting, we got away from the technical and mechanical subjects and had a talk on the rights of labor and of management. Our Entertainment Chairman, Rusty Toolin'39, introduced the guest speaker, Jack Stieber, economist for the United Steel Workers of America. Mr. Stieber spoke of M.I.T.'s outstanding



work in industrial relations and sociology during recent years. He pointed out that Mr. Scanlon, formerly on the C.I.O. staff is now a lecturer at the Institute.

Mr. Stieber's talk concerned the rights of management and of labor to participate in the management of a business. He discussed the rights of management as a prerogative and the rights of labor as a joint right. Management decides what is to be done, how it is to be done, and who is to do it. But these rights, and particularly the last two, are within the bargaining areas of union and management. The unions have felt that a fence should not be built around the rights of management and around the rights of labor. The unions believe that the prerogatives of management today may become joint union-management rights tomorrow. Mr. Stieber said that the U.S.A - C.I.O. is for management labor co-operation and the union has tried to promote this. After this talk, a very lively discussion ensued; particularly with reference to small business. Mr. Stieber felt that if labor were given a real part in running the business, production could be increased. Security versus ability was discussed. The meeting was broken up only by the lateness of the hour since all present were very much interested in this subject and the trends in labor today.

The following members were present: L. H. Bailey'25, H. M. Baker'30, C. T. Barker'27, T. W. Bossert'20, E. L. Chappell'24, P. A. Daniels'34, W. M. Davidson'26, G. E. Goring'49, J. E. Haggett'47, H. E. Heilighenthal'34, R. D. Hoak'28, G. M. Hoffman'28, D. L. Jerman'45, L. K. Johnson'43, Herbert Kay'47, G. F. Meyer'49, C. H. Mohr'33, G. C. Morrisette'35, J. E. O'Neil, Jr.'36, C. F. Peck, Jr.'41, J. A. Phinney'38, W. J. Rapoport'46, A. K. Redcay'34, Henry Rockwood'32, E. A. Soars'21, P. R. Toolin'39, F. P. Walden'28 - GEORGE C. MORRISSETTE'35, *Secretary*, 469 Mapleton Avenue, Mt. Lebanon, Pittsburgh 28, Pa.

## CLASS NOTES

### • 1885 •

I regret to have to announce the death of Redington Fiske who was born in Boston in 1863, and who died in Chestnut Hill, Mass., on April 1, 1950. He started his business career in railroading, working for some 15 years in that field in the west, meanwhile living at different periods in Chicago and Denver. Subsequently, he became connected with the Bell Telephone Company, working for a time in Kansas City and later in the New England area for that concern. In 1910, he entered the investment business, and was affiliated with various concerns in Boston until his retirement early in the '40's. He was also interested in the development of oil properties in the southwest.

During World War I, he served as a captain in the Army Quartermaster Corps, stationed in Columbus, Ohio. He was connected with the Belgian Relief,

and served as the Belgian consul at Boston. For his work, he was decorated by the late King Albert. He also was a leading official of the committee which arranged the reception for King Albert on his visit to Boston in 1919. In his student days at M.I.T., Fiske was very popular. He was interested in athletics and was a member of the '85 tug of war team. I called upon him several times during the past few years and found him as genial and friendly as formerly. — ARTHUR K. HUNT, *Secretary*, Longwood Towers, Brookline 46, Mass.

### • 1895 •

We received from Allison Owen of New Orleans, La., a beautiful, illustrated booklet entitled, "Parkway Commission of New Orleans." Allison Owen was with our Class in Architecture and has followed his profession in his native city for these many years. The booklet is indicative of his appreciation and love for the beautiful, most admirably adapted to the needs of his city. He was appointed to this commission in 1909, serving continuously until 1933, when he was elected to this historic body. From his recent report, as president of the commission, to the mayor of New Orleans, we take the liberty to quote some of its parts: "Most great cities, when they receive distinguished guests, roll out the 'Red Carpet.' New Orleans rolls out a 'Green Carpet,' some sixty-odd miles long, spangled in January with Camellias, in February with Azaleas, in March with Spireas, in April with Oleanders, in May with Magnolias, in June with Crepe Myrtles, and so through the rest of the year. New Orleans does not put on the show for distinguished visitors only, but for every visitor, and for the enjoyment of all the people of New Orleans.

"It has provided a show place at the Will H. Douglass Gardens, open the year round, with its greenhouses, administration building and other facilities comparable with the best of any American city. The employees have civil service status and have earned the esteem of the public by their efficiency and attention to duty. The work is directed by nine citizens without pay and supervised by three men who have devoted their lives to the service of their city." This booklet is valuable to any library and we are glad to possess one. It portrays, unquestionably, the cultural and spiritual values of its outlook, from men who are devoted to the civic needs of their community, and love for the welfare of all the people.

The annual dinner meeting of the Boston Society of Civil Engineers, the oldest engineering society in the United States, was held last March 15. M.I.T. civil and sanitary engineers were well represented, including Emeritus Professor Harold K. Barrows. Harold, with others, was elected to honorary life membership in recognition of a distinguished career as a civil and hydraulic engineer. His late address is at 332 Highland Avenue, Winchester, Mass. Joe Walworth has returned from his Florida stay to his home at 8 Locke Street, Andover, Mass. John W. Ames can be found at his new address, 150 East 81st

Street, New York 28, N.Y. Dr. Charles L. DeMeritt has a new address at 4500 Hudson Boulevard, Union City, N.J.—LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

### • 1896 •

Greetings. May golf and fishing and general outdoor diversion be a part of your daily program. As has been hinted before, our age class is entitled to self-indulgence and should demand that our years of service merit this more leisurely life. We are still receiving \$2 assessment contributions. Thank you. These notes appear in the next-to-the-last issue of this volume — so any communications must be in pronto.

Word from Welles Partridge as of April 18 found him somewhat improved. Although still very much of an invalid, he is better than he was upon entering The Storrow House. We feel sure that he would be pleased to hear from any of his classmates. Address: The Storrow House, Lincoln, Mass. — It is with much regret that we learn of Joe Stickney's disability from his letter written from 3025 North Meridian Street, Indianapolis 8, Ind.: "Like most of us, I am retired and now physically disabled. In 1946, I lost my right leg from circulatory trouble and I have just recently been released from the hospital where I lost the other one. But otherwise, I am in good health and able to carry on some activity from my home. We live in an apartment all on one floor so some navigation is possible and I try to accept the condition as is. There is no use grumbling about it." It is heartening to hear of Joe's fine spirit and I am sure the Class joins with me in sending best wishes to him.

From Yarmouth North, Nova Scotia, Henry Waterman pens the following: "With no bill or notice, I don't know whether I paid my class dues or not - probably not - so here are my two dollars." The following interesting news was received from Samuel Smetters: "I am on my way to Denver, Colo., tomorrow on business for two weeks - will return and be in Buffalo April 17 at Electro Refractories and Alloys Corporation. They have the contract to furnish 31800-porous plates of 80 permeability. I will have a man with me there who will finish the work after due instructions. I expect to be in Boston and Cambridge next June."

With sorrow we must report the deaths of two classmates. James Talbot passed away on March 4, 1949. His address was Dunedin, Fla. We have no further details at the present time. —The following is quoted from the Providence, R.I., *Bulletin*: "Funeral services for Miss Esther Stone of 280 Waterman Street, who died . . . (February 22, 1950), were held . . . at the First Congregational Church. Unitarian. . . Miss Stone, who was a daughter of the late Alfred and Ellen (Putnam) Stone, was one of the first women graduates of . . . Technology, and had formerly been associated with her father's firm of architects. She was born in Providence, Dec. 8, 1872, and attended Mary C. Wheeler School. She was a member of the Unitarian Alliance, the Alliance sewing group, the Handicraft Club

and the English Speaking Union. Surviving are a sister, Dr. Ellen Stone of Providence, and several cousins."—JOHN A. ROCKWELL, *Secretary*, 24 Garden Street, Cambridge 38, Mass. FREDERICK W. DAMON, *Assistant Secretary*, 275 Broadway, Arlington 74, Mass.

## • 1897 •

Albert P. Norris, V, died in Cambridge, Mass., on March 29, aged 75 years. After graduating, he spent several years in Lawrence, Mass., where he was an assistant chemist at the Pacific Mills. Leaving Lawrence, he entered the Harvard Medical School and was graduated from there in 1903. His father was a physician in Cambridge, and Albert took over his father's practice in 1910. For many years he was attached to the board of health as milk and medical inspector, and he was prominent in the campaign to obtain model dairies and clean milk. In 1907 he was named district medical officer for the state board of health. In recent years, Dr. Norris devoted much of his time to historical research, and was the author of numerous historical sketches. He was a member of the American Medical Association, the Middlesex County division of the Genealogical Society and several other groups. He was an active member of his Class in the years following his graduation and attended all class reunions. He was present at the 50th anniversary celebration and reunion at Osterville in 1947. He leaves a wife, two sons, one daughter and a sister. Burial was in Mt. Auburn Cemetery in Cambridge.

Your secretary received a postal card from Hawaii from Jonathan M. Gilmore. He was on a steamboat tour, and wrote very enthusiastically about the "inspiring loveliness, the incomparable beauty, the majestic spectacles and the rich background of legend of the Hawaiian Islands."—a letter from Jere R. Daniell up in West Franklin, N.H., carries the good news that "I am discharged from the hospital. Of course you did not know that I was in so it is in all probability a bit of a surprise. Went into the Franklin Hospital for a slight remedial operation on the 2nd of April and came out on the 17th all sewed up, calked and water tight. Now am recuperating here at the farm watching the birdies and beasties and all the changes of nature at this season. Am counting on being at Technology for the Open House in May and also am counting on being with you all for Alumni Day in June."

Word has just been received, without further detail, of the death in Chicago, on January 18, 1950, of Edward R. Heissler, V.—JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

## • 1900 •

The following have signified their intention of attending our 50th anniversary reunion since the last edition of class notes: Sheldon Graff, F. I. Merrick, Harry Thayer, J. L. Porter, R. S. Blair, E. F. Brigham, F. N. Conant and Paul Delano. This brings the total number who hope to take in some part of the reunion to 53 members and 40 guests. Of these, 46

members and 37 guests expect to go to The Pines with us. The enthusiasm with which so many have responded ensures a very successful and happy reunion.

We have received two newspaper clippings, both referring to men who lived in Andover, Mass., which will be of interest to us. "Philip F. Ripley of Andover, former chief chemist of the American Woolen Company, will be honored by the nation's chemists and chemical engineers at the 117th national meeting of the American Chemical Society in Philadelphia, April 10. A diploma certifying fifty years' loyal support of the society and its activities will be presented to Mr. Ripley by Dr. Ernest H. Volwiler, executive vice president of Abbott Laboratories, North Chicago, Ill., and president of the society, at a general assembly in Bellevue-Stratford hotel. Mr. Ripley is one of eight chemists and chemical engineers to be honored this spring, as fifty-year members of the society. They came from six different states, Washington, D.C., and Ontario, Canada. Born in 1876, Mr. Ripley obtained a bachelor's degree at Yale University and continued his studies at M.I.T. and at the University of Heidelberg in Germany. He then started work as a chemist for the American Woolen Company, eventually becoming chief chemist, a position he held until he retired in 1930 as a result of serious illness. A member of the Society of Chemical Industry, Mr. Ripley has also been active in civic affairs in Andover, particularly the American Red Cross."

"Philip R. French, 75, died . . . Mar. 9, at the Lowell General Hospital. Altho he had been ill for a long time, his vigorous constitution sustained him, so that he was confined to his bed for only two weeks. The serious nature of his illness was not generally known, and his death came as a shock to the community. Mr. French was born in Danvers. After his graduation from M.I.T. he came to Andover, which was ever after his home. An outstanding chemist, he conducted the Bever Mfg. Co., many years. While he was absolutely devoted to business, he never forgot he had obligations as a citizen. He was prominent in the Boy Scouts and the Old South church, and was highly regarded. But he was essentially a home-loving man and was happiest in the companionship of his family. His wife, Clara (Soule) French survives him, also two sons, Richard S. of Waterville, Me., and Philip R. of Oklahoma, a granddaughter Barbara Jane French, who is at Colby college, two grandsons, and a brother George W. French of Plainfield, N.J."

Philip B. Cooper has changed his address again, this time to Phoenix, Md.—We hope to see all the readers of these notes soon after the publication of this issue.—ELBERT G. ALLEN, *Secretary*, 54 Bonad Road, West Newton 65, Mass.

## • 1901 •

The response to the class letter which you received in February has apparently been about on the average. I have yet to hear from the majority, however. Look over your letters, dig out the news sheet and send it along with your two dollars.

I regret to report the death of E. Gordon Thatcher on February 16, 1950. I have received from his daughter the following information: "He was born on February 8, 1879, in Middleboro, Mass., son of Mr. and Mrs. Henry L. Thatcher. Shortly after his graduation from Technology, he came to Fall River, Mass., as assistant superintendent of the Fall River Bleachery, later to become superintendent. In May, 1929, he left the Bleachery to become manager of Bright, Sears and Company (name later changed to Draper, Sears and Company), where he stayed until he retired in September, 1949. On October 20, 1908, he married Edith R. Barker of Fall River and had three children—one son and two daughters. On September 18, 1919, he was commissioned major in the Massachusetts State Guard. He died on February 16, 1950, leaving three children and four grandchildren."

Mrs. Peterson has forwarded to me a letter from A. H. B. Jeffords who lists himself as management engineer in Miami, Fla. He has had a varied career being, among other things, miner, cowpuncher, deputy sheriff and sheriff for a cattle community in Wyoming, manager of the Philadelphia City Pottery Co., then owner of the Yellow Rock Pottery Co., sales manager and traffic manager of Consolidated Telephone Companies of Pennsylvania, assistant supervisor at Carney's Point plant of the Du Pont Co., assistant and later general manager of the Standard Aircraft Corp., Elizabeth, N.J., vice-president Sherman Corp., production engineers, vice-president Trundle Engineering Co., Cleveland, Ohio. "1947 to date, management engineer and builder at Miami, Fla. Mostly beachcombing. Occasionally swimming four or five miles. (Secret: I paddle along with frequent rest periods on lobster pot buoys.) Now and then do a variety of fishing. Recently trying to develop method of catching 250-pound sea turtles with my hands, jabbing short harpoon in their neck then get towed ashore, riding them to keep them on the surface. Most of them get away—they swim too fast for me. At 71 still feel young, full of pep and looking for new ventures."

From the class news sheets received, I have selected the following for this issue. The remainder I will hold over for the first fall issue. F. Ward Coburn, Birdsboro, Pa., Pres. of the E. and G. Brooke Iron Co., Birdsboro, Pa., Pres. of the Richard Ore Co., Wharton, N.J. He says: "From the above you will note that I am still working, like Alfonso Madero; but unlike him, I am glad to have a job. I cannot match his 18 grandchildren, although I can count up to about half that number. You had a most interesting February class letter. Enclosed find my check for class dues. Hope to see you at Oyster Harbors in '51. Don't change the meeting place."—Roger Wight, Harwichport, Mass., real estate broker for Cape Cod properties from Osterville to Chatham and Brewster. He writes: "Retired February 28, 1947, after 40 interesting years in the fire insurance business. Am now enjoying life on Cape Cod, the Florida of New England, and am keeping interestingly busy as a real estate broker. Am keenly looking forward to our 50th reunion and



hope it can be held at Oyster Harbors Club in Osterville. Am much in favor of having our wives attend this reunion."—Anthony W. Peters, West Roxbury, Mass. His information is as follows: "Retired from active work but still act as consultant in emergency. Also do some experimental work in home lab. The past three summers we have spent at Lake Umbagog, Maine. Have had some excellent bass fishing and with the 'put-put' on the back of the boat it is a comfort to know that one doesn't have to row home. We plan to move out of Boston and this nine-room house just as soon as we can find a small place in a warmer clime."

Carl Johnson from Pasadena, Calif., who is owner and operator of the Instrument Flight Institute for training of advanced pilots for employment on the airlines, reports in part: "It seems to me I have about scraped the bottom of the barrel regarding personal news about myself in past reports. I have done something I always wanted to do but was too busy or traveling too much to accomplish when younger. I am a 32d degree Mason, a Knight Templar and Shriner. I note that the Class of 1901 made a rather poor showing in the report of class contributions to the Alumni Fund last year. We have been very fortunate in keeping alive all the years since graduation and Bob Williams says there are 201 members (actually 193 T.H.T.) of the class left. I don't believe that our members are the poorest of any class though there are a great many teachers among us and teachers do not gather much moss. I decided to raise the amount I have been giving considerably and believe others will, too, if they take time off from the exacting duties of retired life and do likewise. The Class of 1900 is going to town in a big way this year, their 50th anniversary, in the matter of donations to the Institute."

—Ed Seaver, whose legal residence is in Needham, Mass., offers the following: "Have been taking life easy since retiring in 1946, spending five months of the winter in Florida, four months of the summer in Duxbury and the rest of the time at my home. It is evident from the class letter that a great number of the fellows go to Florida in the winter. We should try for a get-together for a noon-day luncheon at some central point, like Orlando, that we could all drive to and from in one day. My winter address is 463 East Shore Drive, Clearwater Beach; and if any member of the class is in the neighborhood between Dec. 1 and April 15, it would be a pleasure to see him. Also, Al Higgins is close at hand in St. Petersburg."

From Arthur Hayden of Bronxville, N. Y., whom Phil Moore reported on several months ago, comes the following: "Retired, darn it! I met Philip Moore in Easton, Md., in the fall and he entertained me at his beautiful estate 'Marengo' on the Miles River. He looks young. Mrs. Peterson had written to both of us and our meeting was due to her interest in our Class. She should be christened our class godmother. The class notes are splendid and I only wish I had culled special items and compiled a sort of who's who in 1901."—What do you think of showing Mrs. Peterson some recognition

for her interest in and work for the Class? I believe you all should know that she has continued Guy's membership in the Class by sending me his class dues.

I have just been informed by the Alumni Office that Albert N. Klyver, II, who has been an engineer for the Lamson Corporation of Syracuse, N.Y., passed away last fall. In response to an inquiry, I quote the following from an official of the company: "Mr. Klyver was associated with our company from 1913 until his death on November 15, 1949. During his association with us, he served in the capacity of chief draftsman and engineer. Practically all his time was devoted to designing materials handling equipment and many of the installations are still functioning successfully. Mr. Klyver was active until a few days before his death. Everyone who was fortunate enough to know him feels a personal loss."

Joe Evans, who broke his arm last December, writes that he can now use it satisfactorily. He plans to be at the reunion in 1951.

Bob Williams, our general reunion chairman, reports that it has now been definitely decided to hold our 50th reunion at the Oyster Harbors Club. With Phil Moore, he has visited the Club and the manager says that he can take care of us. If you have not done so already, please send in your reply postal card at once. At the time this is written, we have approximately 60, including the wives, who hope to attend; and there are still a great many more from whom we have not heard.

Your Secretary, having completed 47 years of continuous work at the Institute, will stop teaching at the end of this school year. By my feelings, I am not growing old, but I am tempted to feel so when a student comes to me and says that I taught his father some time ago. I think that it is time to stop before they start telling me I had their grandfathers in class. Will you all please take special note that after June first my address will be 21 Cypress Road, Wellesley Hills 82, Mass. You see, Willard Dow and I are fellow townsmen.—THEODORE H. TAFT, Secretary, 21 Cypress Road, Wellesley Hills 82, Mass. WILLARD W. DOW, Assistant Secretary, 287 Oakland Street, Wellesley Hills 82, Mass.

## • 1903 •

By the time you read this, it will be reunion time; and anent reunions, four of our Class apparently had a very enjoyable one at Clewiston Inn on the south shore of Lake Okeechobee in Florida on February 22. Tom Sears from Boston and Hillsboro, Fla., met W. P. Regestein from Delaware and West Palm Beach, Hewitt Crosby from Maryland and Lauderdale-by-the-Sea, and W. C. Lounsbury from Wisconsin and Fort Myers. The following is from Crosby: "Sears entertained us at luncheon at the delightful Clewiston Inn. He is the only one of the quartet who has not retired. He continues to head his insurance business in Boston, living in Braintree, summering at Wellfleet, and dodging a bit of snow and ice by spending February in Florida. He is rightfully proud of his sons who are in charge of

his office while he is away, and of his daughters, one of whom has recently married. Will Lounsbury, whom none of us had seen for years, has taken on weight and now looks like a prosperous Rotarian. For many years, he was with the Superior Water, Light and Power Company. He has evidently gotten fed up with cold weather at the west end of Lake Superior and has bought a home at Fort Myers. Will is an expert on industrial relations and has served for many years as an Honorary Secretary at M.I.T. He has done exceptionally well in life. He has five children and 11 grandchildren. Reggie brought along his sense of humor and looked much better than last year, having gotten rid of a stomach ulcer in the interim. He lives in Wilmington, Del., where he is active in local affairs. He has three fine daughters, two graduates of Wheaton and one from Vassar. The talk in Clewiston ranged over the years since we were freshmen together just 50 years ago to the present. Some of us had recently seen classmates and were able to tell the latest news of them. Evidently, most of them are retired and are well occupied with local affairs, hobbies and grandchildren. All of the four at Clewiston were lamenting over the 50 cent dollars of this day which don't go well with the fixed incomes on which the man in retirement has to live. Furthermore, the four were unanimous in the belief that, economically, our country was rapidly going to the dogs. Despite this feeling, the meeting was a happy one, and the four could safely be called optimists." They sent me a snapshot of three of them taken by Reggie, I assume, as he was not included.

Again, in re reunions, Gib Gleason is mulling over a list of some 28 names we sent to him, as residents of New York and New Jersey, who would be handy to get together at his house in Bernardville, N.J. Gib writes, and again I quote: "I can recall about 20 of them perfectly; i.e., as they were, only the Good Lord knows how old and decrepit they may look now and whether anyone could recognize any of them. It's all right for me to talk that way because I don't look so young myself anymore. But the doctor did say the other day that when Gabriel blows his horn they will probably have to machine gun me." You, within a radius of 50 miles of New York City, may hear from Gib later. Be ready, if you do, to take a Saturday in June to go to Bernardville.

Once more, on reunions, those of us in the Boston area, or within 50 miles of the Hub, keep in mind June 12, Alumni Day, and try to get in to the luncheon at noon at the Institute. That is a good time to see the new developments at the Institute and have a pleasant reunion with members of the Class. There is opportunity for talk not only with our own classmates, but with acquaintances in other classes as well. This is an odd year for us, and it is not likely that we shall plan a class reunion. Fred Eustis was in Europe for several months, and we'll probably have the latest news about European affairs from him.—FREDERIC A. EUSTIS, Secretary, 131 State Street, Boston 9, Mass. JAMES A. CUSHMAN, Assistant Secretary, Box 103, South Wellfleet, Mass.

## • 1905 •

The big news is, of course, regarding the big 45th reunion to be held at Oyster Harbors Club, Osterville, Cape Cod, Mass., on June 13, 14, and 15. Questionnaires to date indicate an attendance of from 50 to 60, with several coming from some distance; Clarence and Mrs. Gage from St. Petersburg, Fla., for instance. It is the hope of your committee that all planning to attend our reunion will take in Alumni Day at Cambridge on Monday, June 12, but those who do not desire to attend the Alumni Dinner may go to Oyster Harbors on Monday afternoon or evening. The big days are, of course, Tuesday and Wednesday, (June 13 and 14) but those desirous of staying over beyond the 14th may do so. Your committee will plan automobile accommodations from Boston for those applying and further and final notices of arrangements will be mailed to those who have indicated their intention of going.

Little further news is available for this issue. Dez C. Schonthal, Chairman of the Board of the West Virginia Steel and Manufacturing Company of Huntington, W.Va., is coming on for Alumni Day and our reunion, the first contact with M.I.T. or any '05 man since 1905. Dez was a member of the Varsity Basketball Team in 1903. Percy G. Hill, II, was retired by the Western Union in January of this year and plans to spend most of his time at his country place in Conway, N.H. Tom Shaw calls my attention to an error in the class listings as mailed to all members of the Class in March; namely, that he retired from the Bell Telephone Laboratory in September, 1948. Frank Chesterman thought he had retired, but apparently is busier than ever, as he accepted an appointment as chairman of the Philadelphia Parking Authority, under state authority to provide off-street parking facilities—so much business that he fears he cannot attend the reunion. However, he commutes regularly from his farm at Hampton Falls, N.H.

Dick Senger, III, writes that after three years of retirement he is not weary of that state of existence. Dick reports excellent health, lays it to strenuous living. Regrets that he will probably be unable to be at Oyster Harbors in June as he will be on the Pacific Coast. A bulletin from the office of the New England district of the American Society for Testing Materials announced as their speaker for their April meeting our good friend Warren K. Lewis, X, who spoke on the subject, "Competitive Sources of Energy." Undoubtedly, if we could chronicle all of Doc's noted doings, engagements, honors, and so on, we could amply fill the class notes each month. Clarence Gage, II, writes that he contacted Ed Barrier while Ed was in St. Petersburg in March; together they tried to see Harry Wentworth, but found him too ill to receive company.

Had a grand time visiting with Charlie Johnston at Providence and Kingston, R.I., while attending a three-day meeting of the New England Agricultural Engineers. Charlie had to spread the idea of the use of sulphur dioxide in the preservation and improvement of silage, while I attended the irrigation meetings. You should

have heard Charlie talk the chemistry of silage to the cow college professors. One night we called up Bill Green at Barrington, R.I., and Bill came over and spent half a day with us. Bill had more than a superficial interest in the Rhode Island State College as he had been collaborating with one of their professors on planetarium projectors. Bill has been busy building one in his cellar. A terrific storm prevented us from crossing the Jamestown Ferry to visit Bill's home and family.

Through his sister, we learn of the death of John F. Dunn, VI, who passed away at Richmond Hill, N.Y., in January, 1950.—FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 69 Newbury Street, Boston 16, Mass.

## • 1907 •

Having received from the Alumni office during March a notice saying that our classmate, Albert P. Mansfield, is now located at 400 Salem Street, Wakefield, Mass., I telephoned to him on April 18; and for the first time during the last 43 years, I had a nice chat with him. For 41 years he has been associated with the General Electric Company, most of the time at their Schenectady, N.Y., plant, and for many years has been their leading engineer specializing in the application of electrical equipment to the textile industry. It was interesting to me to learn that he knows personally several of the executives of Whitin Machine Works, with which Phil Walker, Gene Banfield, and I are associated. Albert retired from the General Electric Company on March 31, 1950, and is now back in his home town of Wakefield not engaged in any particular industry at the present moment. He has four married children and eight grandchildren.

Through the courtesy of C. A. Clarke, Secretary of the Class of 1921, I have received two clippings from the Newark, N.J., *Evening News*, both of them relating to activities of our classmate, Allan Cullimore. One newspaper article dated March 21 tells of plans that were being made for a Newark Atomic Energy Week, which was to be observed during the week beginning March 27. On March 28, the subject for discussion at a public assembly meeting was to be "Military Aspects of Atomic Energy." Allan served as moderator at that meeting when several scientists and Army officers of international reputation spoke. A clipping dated March 24 stated that Allan, who is president emeritus of Newark College of Engineering, was to be the main speaker at a leadership conference at the college, taking for his subject, "The Role of the Leader."—Among the engineers receiving awards at the March 15 meeting of the Boston Society of Civil Engineers for outstanding papers presented to the Society during the previous year was our classmate, Edward G. Lee, who received the Desmond Fitzgerald award for his paper, "The Proposed Redevelopment of the Water Power of the Connecticut River at Wilder, Vermont."—BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. PHILIP B. WALKER, *Assistant Secretary*, 18 Summit Street, Whitinsville, Mass.

## • 1909 •

If these notes are less than normal, it is due to the fact that the Review Secretary has been on an enforced "vacation" for a month, having been obliged to undergo an operation. He has, however, recovered rapidly and when this number of The Review appears, he should be engaged in his normal activities and as well as ever.

In the March Review, we reported the death of Felix Burton, IV, son of the late Dean Alfred E. Burton. Felix was a member of the Class of 1907, Bowdoin College. Recently, a classmate at Bowdoin, Roscoe H. Hupper of New York, an admiralty lawyer, presented in the name of the Class of 1907 a *Book of Hours* to the Bowdoin College Library in memory of Felix. The book is a rare one, believed to have been executed between 1520 and 1530, and consists of 152 illuminated manuscript leaves on vellum, approximately five by seven inches. The work was done by more than one hand, but 25 miniature paintings are believed to have been executed by a single Venetian illuminator. Experts agree that this was the last period of proper manuscript illumination.

Senator Tom Desmond, I, is the author of an article in the March, 1950, issue of *Trusts and Estates* magazine entitled "You Can't Retire on Money Alone."—PAUL M. WISWALL, *Secretary*, Box 125, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 366 Madison Avenue, New York, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

## • 1910 •

Since Herb Cleverdon is on a well earned vacation, I thought that the Class would like to read about a most interesting and delightful visit with Walter Spalding in Hawaii. Walter has been quite regular in attending reunions in the past, excepting years when two wars interfered. He went back to the Islands in 1945 and has established himself in Honolulu. He has done some interesting jobs there such as the Sears Roebuck Building, the Mormon Temple; and a unique overhead tram system, bringing sugar cane down the mountain to a sea level crushing plant on the Island of Hawaii. He and Mrs. Spalding have a delightful new home on the Pacific Heights section of Honolulu with a view from Diamond Head to Pearl Harbor and beyond, with a backdrop of mountains and valleys. Mrs. Hield and I had several enjoyable visits with the Spaldings. Walter hopes to be in New York on business in June; and, if so, he will be with us at the reunion.

I cannot resist another plug for the reunion. I hope that you have sent in your reservations to Paul Broderick in care of Herbert Cleverdon's office — Cleverdon Varney and Pike, 120 Tremont Street, Boston 8, Mass. — and that you have urged others in the Class to attend. The Alumni Association has mailed to you the information on All-Alumni Day in Cambridge. Be sure to send in your card asking for reservation information for that



day, or write to the Alumni Association in care of M.I.T., Cambridge 39, Mass. The committee is hopeful that many of you will drive to New London and will have room for classmates who do not have transportation for the trip to Cambridge on the 12th. Be seeing you in June.—CLIFFORD C. HIELD, *Reunion Chairman*, 719 Nicolett Avenue, Minneapolis 2, Minn.

## • 1911 •

One of our most illustrious classmates has asked not to be nominated for reelection as a director of the Jersey Standard board, plans to retire in the fall and will continue as a vice-president of the company until then. A scientist of established reputation when he joined Standard Oil Company (New Jersey) in 1927, his versatile career in the oil business has ranged from research to sales and public relations. Born in North Adams, Mass., in 1888, he attended grade and high schools in Taunton. Deeply interested in chemistry as a youth, his ambition was to attend M.I.T., an aspiration realized with the help of a variety of summer and Saturday jobs which included street car conductor and shoe salesman, we are told. Graduating with us in 1911, Bob Haslam, X—you guessed it—continued as assistant instructor in analytical chemistry before joining National Carbon Company in Cleveland, where he was consecutively research chemist, production engineer and assistant superintendent. In 1920, he returned to M.I.T. as assistant professor and head of the School of Chemical Engineering Practice and for five years directed the research laboratory of applied chemistry, also inaugurating the course in gas and fuel engineering and serving on occasion as consultant to the Standard Oil Development Company.

In 1927 he accepted a long-standing offer to become a member of the Board of Directors of that organization and under the broad program which he instituted, inaugurated research which led to some of the most important products and processes in the industry today. In 1933, he was made co-ordinator of the lubrication sales department of a marketing affiliate and two years later became general sales manager, where he made many contributions to improving the efficiency and lowering the cost of distribution of petroleum products. He resigned as sales manager in 1942 to become a director of Esso, having as his primary responsibilities sales and public relations. In 1945, he was elected a vice-president.

He is coauthor of two well-known books: *Fuels and Their Combustion* and *Britain's Fuel Problems*, while among his many scientific papers and addresses, a talk published under the title of "New Frontiers" became nationally known for its broad analysis of the potential future. (We remember reviewing it in these class notes earlier.) Bob is a member of the M.I.T. Corporation, a Chevalier in the French National Order of the Legion of Honor, a Fellow of the British Institute of Fuels, a member of the British Institute of Petroleum and the American Petroleum Institute, the Society of Automotive Engineers, as well as the professional

technical fraternity of Alpha Chi Sigma and the honor society of Tau Beta Pi. He also is a member of the Madison Square Garden Club, the University Club, 29 Club of New York, Gattineau Fish and Game Club in Canada, and the Baltusrol Golf Club, his home being in Short Hills, N.J.

We salute you, Bob, and wish you the best of everything in the many years of retirement we hope you have! In response to a congratulatory letter I wrote him, Bob's secretary said he was now in Europe and so "will not get over to Alumni Day in June as he does not plan to return to the United States until the end of June." We'll miss you June 12, Bob.

"Heating and Ventilating a Bus Garage and Repair Shops" is the title of an illuminating article in the March, 1950, issue of *Heating and Ventilating*, by Jim Campbell, I, member of Eadie, Freund and Campbell, New York City consulting engineers. In it Jim discusses in detail the work leading up to the determination of the proper ventilating and heating facilities for a garage now being constructed in Brooklyn to provide garage space for 300 buses and shop facilities for 2,000 buses. One of the big problems, dealt with in quite some detail, is the removal of the toxic exhaust gases and fumes in a two-story building, 740 feet by 322 feet, where, due to the grade of adjoining streets, there are doors on but one side and no openings for ventilation in the other walls of the garaging area. To give you some idea of the vast problems involved in designing such a stupendous system, consider some of the phases of the work involved: gas dilution, fresh air demand, heating, air sampling, Diesel engine exhaust, Diesel operation requirements, snow melting, light repairs, cleaning operations, engine tests and dust-producing operations, such as glass grinding, sand blasting and grinding wheels.

In "Getting Personal" the editors trace Jim's career prior to the forming of his consulting firm 35 years ago. He prepared for M.I.T. at Woodberry Forest School in Virginia and after graduating with us worked as engineer on the valuation of the New York Central Lines and on the Lehigh Valley Railroad. He later took an industrial engineering job with a New England shoe manufacturer, but the routine of small town shoe factories was soon exchanged for more interesting work in a New York consulting engineering office where he not only gained valuable experience, but also met his present partners, John G. Eadie, M.E., and Mortimer Freund, E.E. The firm's practice has covered all branches of engineering work relating to industrial plants as well as housing projects, hotels, commercial, institutional and other types of buildings. Jim is a member of Beta Theta Pi Fraternity, the American Society of Civil Engineers and the New York State and National Societies of Professional Engineers. He is also a member and past president of the New York Association of Consulting Engineers and lives in Mt. Vernon, N.Y.

"Farm Boy Helped Build Northeastern" was the title of a feature article in the March 19 magazine section of the Boston Sunday Post, with the sub-title "Flourish-

ing University Founded on Old-Fashioned Principle of Study and Work." Here is told the story of our classmate, Carl S. Ell, XI, who transferred to M.I.T. from DePauw University at the start of our junior year and by dint of outside work and constant application was able to pick up extra engineering practice and knowledge and still get his degree in regular course. Carl, as you know, was of great assistance to Dr. Speare, the founder and first president of Northeastern University in Boston—second only to the University of Cincinnati in instituting the plan for university students to alternate work in the field with classroom instruction.

After graduating with us, Carl continued another year and got his master's degree, then became a full-time instructor at N.U. and was also head of the civil engineering department. In 1917, he was appointed dean of the School of Engineering and in 1924 became vice-president; then, in 1940, he became president—the position he continues to hold so capably. Carl is proud of the progress that the school has made during his own connection with it, although he disclaims credit for the growth. Today there are 4,000 day students at the university, as compared to the eight in his first night class—and there are now 8,000 night students. According to Carl: "One of the reasons why Northeastern has flourished is that there are so many jobs available here for students. They get jobs, and as they learn they progress in their work, so when they get through college they are not just starting. Why, we could not exist if there were not job opportunities here in New England."

C. R. Johnson, X, sent me a clipping from "This Week," magazine section of the New York *Herald Tribune* for February 26, titled: "Baby Buggies Are Big Business," in which credit was given to C. R.'s roommate during four years at M.I.T.—Harold Shaw, II, who breaks into our class notes thereby for the fourth straight month. "On the morning of May 28, 1934," the article starts, "two hours after extras and radio had flashed the miracle of the Dionne quintuplets to a sleepy world, Harold F. Shaw, a crack designer of baby carriages, received orders to embark on 'Operation Fullhouse.' Three weeks later there was unveiled a streamlined, six-wheeled jumbo baby-carriage capable of accommodating the new Dionne arrivals. Shortly thereafter, Shaw's employers, the F. A. Whitney Baby Carriage Company, Leominster, Mass., offered this super baby buggy as a gift to the Dionne family." "I am glad to see this recognition of Harold's work," wrote C. R., "he followed his father there in design work for the Whitney outfit."

M. J. Lowenberg, VI, senior electrical engineer, Stone and Webster Engineering Corporation, Boston, was guest speaker at an early April meeting of the Boston section, American Institute of Electrical Engineers discussing "Economy in Power Station Costs—A Challenge to Engineers." Here is a summary of Maurice's talk: "Rising costs are a challenge to engineers and it is absolutely necessary for them to find ways and means of reducing the investment cost. To do this it may be necessary to take certain business risks

not considered advisable, or even taken, in the past. One must be sure not to lose out by reducing installation costs to such an extent that it results in increased production costs due to increased maintenance or service interruptions; also it is necessary to see that the service rendered to the customer is made no worse than what he now has, but on the other hand, where it is now necessary, it may not need to be improved unless economy results.

"A word of caution in endeavoring to reduce costs. Inferior design and workmanship should not be permitted, and the use of untried or unproven materials should be limited to where their failure will not affect service. Laboratory tests of new materials, while helpful, are not conclusive as to how they will perform after installation. Engineers must overcome opposition based on operating experience that is no longer applicable. An engineer should not create a monument to himself that is a burden to the stockholder."

Although details are lacking, it's fine to hear that our class president, Don Stevens, II, was back at work at Okonite in mid-April, following a three-week enforced layoff due to a painful automobile accident injury which knocked out all the nerves on his right side from head to foot. You see, you just can't keep a good man down!—By contrast, however, it was with great regret that word was received recently that Thorne Wheeler, X, for years a stalwart with Arthur D. Little, Inc., in Cambridge, had a brain lesion last October which forced his retirement from the active business world on New Year's Day. He left on April 25 for Chatham, N.Y., where he and his wife will make their home on a farm that he has had as a "retreat" for some years. "I shall hereafter raise flowers and vegetables," he concludes, "instead of chemicals." Best of everything to you, Thorne, including a return of good health in the outdoor life which will be yours now!

Cards recently received from traveling classmates have been most welcome: Daisy and Sellie Seligman, III, from Boca Raton, Fla., and Elinor and Charlie McManus, I, from Washington, D. C. Greetings also from Grace and Harry Tisdale, V, reporting they are fine, as are their Scarsdale neighbors, Rose and Joe Harrington, VI. Just at hand on April 18 a card from Jim Duffy, VI, mailed in Hong Kong on the 14th depicting a Chinese eating rice from a bowl and captioned "Lunch Hour—Hong Kong." The message: "Confucius Says: 'That O. B. Denison good organizer! Maybe he come and organize China. We need harmony and he is top song-leader.'" Thanks, Jim.

We learn that Dick Ranger, VIII, was among the founders of the Audio Engineering Society two years ago, also we noted in the March, 1950, edition of *The Boston Port Reporter*, a picture of the Port of Boston Development project engineers, which includes Hal Hallett, VI. In early April, Fred Daniels, VI, was host to a party at his Riley Stoker Corporation plant in Worcester, that was "divine," according to the Worcester *Evening Gazette*. The star attraction was Joseph Pazul, 73, of Leicester, Mass., who numbers himself

among the few practitioners of the art of "dowsing"—finding underground water with a forked stick. It seems Fred needed some water to run a proposed air-conditioning system at his plant, so he invited a score of people—believers and unbelievers—to see the grizzled and cheerful man in the canvas coat and battered hat step up with the slender branches he uses for divining rods. With arms at waist level, the story states, Mr. Paul walked along close to the plant, holding in each hand the thin tines of a forked branch from an apple tree. Suddenly the rod twitched in his hand. He gripped it tight and it slowly began to bend like a trout rod hooked onto a 75-pound salmon. It pointed straight down. "There it is," said Mr. Paul. "Your water is under here and plenty of it." Fred then proceeded to show his guests that he was a "dowser" besides being president of a corporation. "It works every time," said the gleeful Mr. Daniels, according to the story, when his rod snapped down to the ground. Three green and white posts and Mr. Paul's reputation are now staked out on the Riley Stoker grounds at undetermined distances above water.

John Scoville, IV, writes that he saw Louise and Nat Seeley, II, in early April and between them they decided that the theme song for our '51 reunion might well be: "Enjoy Yourself! It's Later Than You Think." A capital suggestion, let's talk it over when we meet at Alumni Day at M.I.T. this year on Monday, June 12. Have a good summer, all of you!—ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

## • 1912 •

We regret to record the passing of Merle Randall on March 17. The following is taken from the New York *Times* obituary: "Dr. Merle Randall, Emeritus Professor of Chemistry at the University of California, died . . . in Alta Bates Hospital after a brief illness. He was 62 years old. A graduate of the University of Missouri, he was a fellow at Massachusetts Institute of Technology, where he received his Doctorate in 1912. Dr. Randall joined the University of California that year as research assistant, became a professor of chemistry in 1927 and professor emeritus in 1944. Dr. Randall, who was the author of many scientific articles, did considerable research before World War II in heavy water. He was a member of the American Association for the Advancement of Science. Surviving are his widow, and two sons, Merle D. and Robert W. Randall.

"Dr. Randall was the discoverer of a method of spraying the walls of mercury mines with a solution of the polysulphides of sodium and other elements to prevent evaporation of the volatile metal. Previous to its development in 1942 many miners exposed to quicksilver vapors were made ill within a short time." He was author or coauthor of many scientific articles and books, the best known of which was "Thermodynamics and the Free Energy of Chemical Substances" (1923 with Dr. G. N. Lewis).—FREDERICK J. SHEPARD, JR.,

*Secretary*, 31 Chestnut Street, Boston, Mass. LESTER M. WHITE, *Assistant Secretary*, 4520 Lewiston Road, Niagara Falls, N.Y.

## • 1913 •

Contributions to class notes have been pretty good. Usually silent George Clark, II, has been very busy, indeed, in the fast growing plastics industry. He writes: "I have always considered you to be fundamentally honest, so I enclose herewith one 'buck', because it isn't much. I am still struggling with the job of being chief engineer for the Formica Company. I have just been through the rather unfortunate experience of employing two Technology men from last year's class and having lost them, both for reasons beyond their control or mine either. I shall be back next month looking for replaces for them and probably some in addition. In the engineering division here, which, by the way, includes research and development, M.I.T. men constitute about 50 per cent of our crew. I mix in so many activities outside the affairs of the Formica Company, but within the plastics industry, that I have very little time to closely follow M.I.T. activities. It may be of interest to you and to other members of the Class that the writer continues an active interest in the research being carried on at M.I.T. by Professor Dietz for the Plastic Materials Manufacturers Association. We are faced again this year with the problem of refinancing." Bob Bonney, X, has acquired two new honors; namely, president elect of the Federation of Paint and Varnish Production Clubs, and the new member of the board of directors of the American Society for Testing Materials, for a three year term. H. E. Crawford, IV, writes that there is a great deal of engineering out his, Washington State, way: Hanford Atomic Bomb Project, McNary and other Columbia River Dams and Grand Coulee Irrigation Projects. Warren Glancy, X: "Nothing startling; I did see Clarence Brett for a few minutes when he was visiting his brother Alden—Treasurer of Hood Rubber Company—Clarence tells me that he is mayor of his town in New Jersey—is it Teaneck? I hear from other sources that this town is looked up to as a real model for town-manager type of government."

William Guild, XI, was in Florida until May, enjoying a field trip, collecting carnivorous plants, salamanders and reptiles. I'll bet Bill eats nothing but protein food. Prescott Kelly, XI: "Nothing much happens nowadays that's new, except grandchildren. I now have six. I have been busy of late in the establishment of a new boys' school under the Will of Harvey G. Woodward '88, of which I am one of the governors. Business, this work, and my photographic activities, keep me very busy. I took up photography when I gave up golf, and have built up a rather good outfit. I am serving this year as president of the Birmingham Camera Club." In 65 years a prominent New York engineering firm has had five firm names and five senior partners. That firm is now called Parsons, Brinckerhoff, Hall and Macdonald. The latter is, of course, our Gene, I, who wrote: "In January, our engineering firm celebrated the start of its 65th year



in business by having a company dinner. As senior partner (thereby emphasizing one's age) I was permitted to address the 175 employees who attended and the speech was received much as that one was in June, 1913, called "History of the Class 1913"; that is to say, with some indifference and some amusement." Gene sent me a book, containing excellent photographs, and short descriptions of some of the outstanding engineering projects selected from some 400 jobs for 160 clients. The firm's field, in engineering and architecture, is very broad and operations are world wide. One hundred and fifty persons are now connected with the firm. Knowing the senior partner, you wouldn't be surprised to read on the frontispiece of the book: "When we mean to build we first survey the plot, then draw the model, and when we see the figure of the house then must we rate the cost of the erection; which if we find outweighs ability, what do we then but draw anew the model in fewer offices, or at last desist to build at all?" (from King Henry IV).

Victor Mayer, I: "It is only my innate modesty that stops me from telling you about my work in building large office, factory, apartment and store buildings in New York, Kansas City and Beverly Hills. And this foolish modesty also prevents me from telling you about an exhaustive study and report I made for the United Engineering Societies in New York. Do you think I ought to get a public relations man?—Or, do you think that, in my subtle way, I can get along without one? However, and with no diffidence or subtlety, Victor, Jr., my son, is in his third year of postgraduate work at Technology, where he is some kind of research assistant. He has passed all his examinations and now requires only the acceptance of his thesis to qualify for his Ph.D., which he hopes (?) to get next summer at the advanced age of 22. Can any 1913 man beat that?" Write to me now, you sires of scholars, if you can match Vic. Bob Portal, VI: "Business in the advertising field is really booming, and we hope that the next five years will be as successful as the last—not only for us but for everyone connected with the business world." Wood Selfridge, II, at San Francisco: "We're having a lot of fun and hard work on the Funding Program out here. It has done more to drag the Alumni out of the moth balls than anything ever did." Bob Tullar, II: "I am still with RCA in Camden in the engineering department; in fact, I'm just starting my 30th year with them. I manage to spend a little time each year in Tucson, Ariz., vacationing and visiting with my relatives. It's wonderful country. I see Bob Weeks occasionally at our alumni meetings. He's a great guy—more pep and push than ever."

Peripatetic Andy Vogel, IV: "Since I wrote you last, I have been on a trip in connection with building design and construction to Turkey, India and England which occupied the months of February, March and April of 1949. For the benefit of the architects, St. Paul's in London, Santa Sofia in Istanbul, the Taj Mahal in Agra, India, and the pyramids at Cairo are all worth seeing. In addition, there are many wonderful examples of architecture all over India. For the benefit of

the manufacturing group, there are some very good industries in India and the technical exhibitions in Cairo showed modernization hard for an American to believe could occur there. The excellence of the machine tool work reminded me of high-class work in the States. My next trip, starting in a few days, will be to Venezuela, Cuba, and Mexico where my interests will be building construction and manufacturing." Max Waterman, II, Vice-president of the Singer Manufacturing Company, always one to stick close to his job, did get back to Technology recently on the Course II Visiting Committee. C. P. Wetherbee, VI: "By a strange coincidence, three of us from the Class of 1913, Course VI and in the W category—Bob Weeks, Ken Wright and myself (Wetherbee)—find ourselves working together on the M.I.T. Development Plan in the Philadelphia area. As would be expected, Bob Weeks has thrown himself heart and soul into the project and has taken quite a load on himself. The social end of our group meetings is very enjoyable. Bob is in business for himself (builds radio towers, among other things), Ken is with the Baldwin Locomotive Works and I am with the Telephone Company in Philadelphia."

J. Harty, IV, has "just two grandchildren; one Class of '70 and a girl four and one-half months old." Bill Brewster, II, rope maker, on many boards of directors, a man of few words: "Just had our 8th grandchild." Dave Stern, V, reports the arrival of a new grandson, whom he hopes may be a prospect for M.I.T.

Charles Albert Smith, III, a member of the firm of Barnett, Hopen and Smith, civil engineers and land surveyors, at Pasadena, Calif.: "As for me, I have always been more interested in being an engineer than in making money; and the results, as regards the last half of the above statement, certainly show how true it is. They say that an engineer is nothing but an educated tramp. I have lived in tents, shacks and houses, in mountains, on deserts, in roaring mining camps and cut-throat cities. I have swung pick and shovel, packed transit and chain over hill and dale, and have parked myself on burros, mules, horses (sometimes cactus, too), stools, swivel chairs and behind steering wheels as well. I have taken chances on mining, flood control, water supply, sewage disposal, subdivision of land, design of residential and industrial buildings, and what have you. Whenever I have made a little stake, somebody has been smarter than I; so I am still at the bottom of the economic mountain, gazing without rancor or envy at those who have climbed to the dizzy (and maybe chilly, I would not know) heights of eminence. My very lovely wife, Rose (whom I found in Arizona), and I have been married for 32 years. We have raised two fine sons, David and Donald, both of whom returned, unharmed from the recent war, with ribbons, medals, oak leaf clusters galore, and without swelled heads over their achievements. Both our sons have wonderful wives and fine children (one grandson and three granddaughters). All of them live not too far away and they all appear to think the world of the old folks. Be-

tween them, several evenings a week are devoted to our enjoyment. The firm name of Barnett, Hopen and Smith has supplanted the old name of Harold A. Barnett. Will you please change the name accordingly on your records. The address is the same." Thank you, Charles, for a gem, this vivid brief story of a life that has yielded a very substantial reward. At our age, I can think of no satisfaction in life which can exceed your precious "several evenings a week."—FREDERICK D. MURDOCK, Secretary, Box 788, Pawtucket, R.I.

## • 1914 •

George Whitwell, Vice-president of the Philadelphia Electric Company, just keeps bobbing up in the news. This time, we find him being appointed the 1950 chairman of the American Gas Association General Convention Committee. This committee is responsible for the 32d AGA Annual Convention which will be held at Atlantic City the first week in October.

Several '14 men attended the Newcomen Society Dinner held in Boston on March 23, at which Dr. Compton presided and Marshall Dalton '15 was the speaker. Dalton presented a paper on the life of Edward Atkinson, a member of the Institute's Corporation from 1862–1890. Classmates present were: Gardner Derry, Ernest Kerr, Dana Mayo, and your Secretary. Clarke Atwood had made a reservation, but his plane was grounded so he did not arrive in time.

Do not overlook the fact that there is no separate Alumni Fund campaign this year. It is all part of the big twenty-million drive, which is currently about 60 per cent complete. Do your best, because it will take a lot of pushing to get that last 40 per cent pledged.—Alumni Day is back on a Monday schedule again. It is to be on June 12. Be sure to mark your calendar.—H. B. RICHMOND, Secretary, 275 Massachusetts Avenue, Cambridge 39, Mass. ROSS H. DICKSON, Assistant Secretary, 126 Morristown Road, Elizabeth 3, N.J.

## • 1915 •

It won't be long now before we'll all be together at our 35th reunion at Coanmessett Ranch, North Falmouth on Cape Cod, June 9 through June 12; returning to Boston on June 12 to visit M.I.T. on Alumni Day and enjoy the class cocktail party for ladies at the Copley Plaza Hotel, Monday afternoon from 4 to 7 o'clock. Last-minute reservations for the reunion may be made by telephoning me at Boston, KEmore 6-7887; or at home, LOnghood 6-3438. For you Boston and New England classmates; even though you may not go to the reunion on the Cape, you are cordially invited and strongly urged to come with your lady guests to the class cocktail party on Monday.

With the generous and widespread response to class dues (have you paid yours?) came a shower of interesting letters for this column. Bill Holway certainly is lucky to have such a proud and enthusiastic wife as Hope who, in turn, is fortunate to be such an able secretary. To top off her fine letter from 302 East 18th Street, Tulsa 14, Okla., Hope and

Bill are coming to the reunion. "When I sent the class dues, I told you that a letter would follow on the activities of the W. R. Holways. Here it is. I seem to be the letter-writing member of the family. We are still operating as W. R. Holway and Associates, consulting engineers, and the associates are D. K. Holway, electrical engineer; William Nye Holway, civil engineer; Frances H. Holway, general filling-in-the-gaps; and W. R. Holway, senior partner. Our head office is in Tulsa, with an office in Vinita, (Oklahoma) near the Grand River Dam Authority Office, and also doing considerable work for electric co-operatives in northeast Oklahoma. Another office at Pryor (Oklahoma) is handling most of the Spavinaw Water Project for the city of Tulsa, the recommissioning of the steam plant for the Grand River Dam Authority, and drafting, field work, estimating, and so on for various municipal jobs. The partners office mostly in Tulsa and most design is done at this office. We have now approximately 50 employees. The \$15,750,000 Second Spavinaw Water Project is approximately half completed, with a new dam, river crossings, tunnel work, and such other to be done during 1950. The concrete 60- and 72-inch pipe is being manufactured at Pryor and is several months ahead of schedule. Young Bill, M.I.T. '43, is in charge of this work. The Grand River Dam Authority is engaged in a \$5,000,000 expansion program, including the recommissioning of the Chouteau Steam Power Plant (formerly the Oklahoma Ordnance Works) and various transmission lines and substations, this work in charge of D. K. Holway, M.I.T., M.S. in Electrical Engineering, '47. Besides these two projects, we have water-works, sewerage, and power work for various Oklahoma municipalities. There is also the Flying H Ranch on the shores of 'Grand Lake,' where the partners have a house and a ranch of about 1,300 acres, raising registered whiteface and polled Hereford cattle and registered pigs, also furnishing themselves with thick cream, milk, eggs, butter, and all kinds of meat. Week ends are spent there by some of us the year 'round and in the summer the families enjoy the swimming, boating, and fishing that the lake offers, as well as the products of the garden and the orchard which fill our freezers with fruit and vegetables for the year. There are five young Holways living in Tulsa: D. K.'s three boys and Bill's girl and boy. Our daughter is now living in Champaign, Ill., where her husband is building an 'electronic digital computer' for the University of Illinois. They have a three-year-old redheaded daughter who can rattle off electronic terms as fast as any physicist. The writer of these notes is a trustee of Radcliffe College and so visits Boston three times a year. Last summer's great experience was the Goethe Convocation in Aspen, Colo. I hope this is enough to show you that there are opportunities for work and for play awaiting the young engineers of today—out here in Oklahoma."

A thrilling foreign letter from Ray Gladding, Cia.Vale do Rio Doce, S.A. Av. Presidente Wilson, 164, Rio de Janeiro, Brazil: "I have never written for the class notes and should be ashamed for this

neglect. For the past several years I have been chief engineer of this company, and at present I am also pinch-hitting as superintendent of the iron mines at Itabira in the interior of the State of Minas Gerais. Quite a far cry from Course XI. My son, who recently graduated from the University of Hawaii, is now in Brazil with the Canadian Light and Power. He was reconnaissance pilot in the Pacific during the War. It is fine to have him near me."

The long-distance prize candidate for the reunion is Arthur Ball, 12720 Hollywood Street, Los Angeles 24, Calif. He writes: "I am planning to attend the 35th reunion in June. I judge from the class notes that I missed out on a meeting in Los Angeles last fall when Gene Place was out there. We (i.e., Mrs. Ball and our son, David) went abroad in August last expecting to be gone two months, but we didn't get back to New York until mid-February. The delay was caused partly by my coming down with appendicitis in Zurich—not a bad place to pick for such an event. I recommend its hotels, hospitals and surgeons. Our home is still Los Angeles, but we spend a great deal of time in Connecticut. Our son, David, stayed on in Paris to study music at the Ecole Normale."

That irrepressible Herb Anderson had to go to the Beach Hotel at Nassau to recover from his recent trip to the Orient. "Just before leaving home I put all my mail in one nice bundle to be attended to while away and your touching epistle reached the top today. Somehow, I remember a note from Ben Neal, but until I get back to Palm Beach next week it will have to remain unanswered because I don't have his address with me even though I remember the subject involved. Alice and I have been here a few weeks, but the call of the robin in Pennsylvania gets louder each day, which means home by Easter. We are planning to be on hand for the 35th."

From Harvey Daniels, in care of Standard-Vacuum Oil Company, No. 8 The Bund, Yokohama, Japan, Box 404: "I have just been working on my personal papers in preparation for leaving Japan for the last time and returning to the U.S.A. to retire from active service with the company. Among the papers that I find is an exchange of correspondence that I had with you in February, 1948, and since then I have been among those missing as far as you are concerned. My wife and I expect to visit relatives and friends on the East Coast in April; and, if I get to Boston, as I expect, I will make an effort to get in touch with you. I have recently received a postcard notice about the 35th reunion plans and it looks most doubtful that I will be able to attend. Family plans are developing out in Minnesota which will require that I be there rather than in the east in the early part of June. Please pass on my kindest regards to old friends." Harvey wrote again from Yokohama: "This finds me on the eve of my departure, as my wife and I are sailing tomorrow for the United States. After 34 years, we are retiring to a new type of life in which we become residents of the United States at Wayzata, Minn., Route 3. We will surely be seeing you sometime,

if not this spring."

Otto W. Hilbert, Corning Glass Works, Corning, N.Y., writes: "We had an interesting meeting in Corning last night starting off the M.I.T. Fund Dinner. Thirty attended the first M.I.T. meeting ever held in Corning. Ralph Jope<sup>28</sup> did a good job."—Tower Piza's sense of humor remains as delicious as ever; but after his humorous first sentence, I would judge from the rest of his letter that is slowing down: "Replying to your cordial inquiry, my family is fine. Hope yours is, too. Let me know when you are down in the big city and let's have a bite together. The twin bed is seldom occupied now, and it is always yours for the asking."

Alan S. Dana, 185 Wakelee Avenue, Ansonia, Conn., has just returned from a two weeks' airplane trip to Europe. "Mr. Dana," writes the Ansonia *Evening Sentinel*, "chief engineer at the Kerite Company, Seymour, covered 9,000 miles by plane on a trip which took him to Ireland, France, Italy, North Africa, Spain, and Portugal. He left LaGuardia airport on March 11 and returned on Saturday, March 25. Seventeen hours after he left New York Mr. Dana arrived at Shannon, Ireland. His next stop was Paris where he spent a week. He visited the Palais de Justice and the Cathedral of Notre Dame, the Place de La Concorde and the Louvre, the Eiffel Tower, the Trocadero, the Bois de Boulogne, the Cathedral of Sacre Coeur, the Church of Saint Pierre de Montemarte, Napoleon's Tomb, the Palace of Versailles, the Cathedral de la Madeleine, Sorbonne University and the Luxembourg gardens. He attended a Rotary meeting in Paris. After a brief stop at Zurich, Switzerland, and Milan, Italy, Mr. Dana arrived at Rome. He visited the Pantheon, the Vatican Museum, and galleries, the Sistine Chapel, the basilica of St. Mary Major, the basilica of St. John Lateran, the old Appian way, the tombs of Priscilla and of Geta, the catacombs of St. John Calixtus, the church of the Capuchin monks, the Borghese picture gallery, the fountain of Trevi, the Colosseum, the basilica of St. Paul, the Palatine hill and the Capitoline hill and the Roman Forum. Mr. Dana also visited Naples, Sorrento and Capri and Pompeii."

I know you will all join with me in being happy that good old Speed Swift has completely and successfully recovered from his serious eye operation and will be with us, cigar, straw hat, and other "impedimenta," at our reunion. "At this time last year, I was recovering from my cataract operation so was unable to celebrate in Boston with others of the 1915 crowd. My operation was successful. Now I do all my own driving, and many other things. I have every intention of coming to our big reunion this year and will try to induce the fellows in the north country to do likewise."

Frank Boynton sets an example with an unusual hobby: "I am doing structural engineering work for the firm of Hillman and Nowell in Los Angeles. No children or grandchildren to write about—just birds. My wife and I are amateur ornithologists and bird banders. Birds are lots of fun. Regards to all."—Charlie Williams, consulting engineer, 60 East 42nd Street,



New York City, pens: "Thanks for an opportunity to 'Help Azel and 1915.' Hope and I just got back from a short West Indies' cruise on the *America*. Had a wonderful trip."—My goodness, what a reputation friendly Doug Baker, International Telephone and Telegraph Corporation, 67 Broad Street, New York City, gives my letters! He writes: "If I weren't sure that nine-tenths of the letters would start the same way, I would say 'I cannot resist your touching letter.'"—Another tourist, Clive Lacy, 261 Nahanton Street, Newton Center, Mass. "Our oldest son, John (M.I.T. '42) is to be married on February 25 to Barbara Muther at Chestnut Hill. Next Wednesday, Mona and I expect to leave on a month's trip to Arizona and New Mexico, and will see you upon our return."

A note from Bill Tallman: "My family is still intact with three grandchildren now: Peter, Coralie and Sara Ellen, who arrived in October, 1949, at Chincoteague, Va." Bill's address is 28 Fort Street, Fairhaven, Mass.—Hibernating in Rumford, Maine, Ted Spear writes: "This is a short letter, but how are you anyway? Nothing much new as far as I'm concerned except a couple of grandchildren, more and harder work, and more and more snow."—Jim Tobey, 319½ East Lakewood Road, West Palm Beach, Fla., writes: "Your touching letter was forwarded to me here in the sunny south, where I have been since early February and plan to be until the end of March, basking in the sun, swimming in the warm Atlantic, and avoiding the snow, sleet, dirt, turmoil, and other disadvantages of the northern climes. I am as brown as a nut. I sold my house in Rye, N.Y., in January and then went to Washington, D.C., for two weeks of active duty in the Army, in the office of the surgeon general. It was a profitable if somewhat bewildering experience. Down here I have looked in at the dog races, and have spent one pleasant, if not very profitable, day at the Hialeah Race Track in Miami. If any of our classmates were among those who bet over a million dollars at Hialeah the day I was there, I hope they remember you out of their winnings. Come down and see me sometime."

Bill Spencer, 213 Cedarcroft Road, Baltimore, Md., once had my job as secretary, so when he sends a check toward postage stamps, I know what he means! Funny man, Bur Swain, will be at the reunion, and writes about class dues every two years, "Yes, it *ain't* enough." Howard King, 50 Longview Road, Port Washington, N.Y., reports his first grandchild, his daughter's son, Jonathan K. Schlefer, born July 4, 1949. Suppose he is entered in Course I? Charles B. (Boots) Malone, Jr., Roxbury Road, Stamford, Conn., is brave to be coming to our reunion after having been in the hospital for 12 weeks. We'll all be glad to see him and we hope he is completely recovered. At last reports, Abe and Haya Hamburg, 19 High Street, Boston, were touring Italy, but they'll return in time for the reunion.

With all your help for Azel, I'll be seeing you at the reunion!—AZEL W. MACK, *Secretary*, 40 St Paul Street, Brookline 46, Mass.

Just too late to make the May issue, we received a nice letter from Howard Green. He wrote: "Your deadline is approaching so rapidly that I will not be able to do the job which you requested; namely, what have I been doing during the past five or 10 years, what do I hope to do, hobbies, where the children are now, and so forth. My son, Howard Thacher Green, was married on June 28, 1948. He graduated from Yale in metallurgical engineering, was on a destroyer in the South Pacific during the War, and has been working for his doctor's degree in metallurgy at the University of Pennsylvania since his discharge from the Navy as a lieutenant, j.g. He expects to get his degree this year and his mother and I hope that he will locate somewhere near Cleveland. I am enclosing a page from last Sunday's *Plain Dealer* which will be self-explanatory as far as Patricia Anne is concerned. Her husband is an M.I.T. graduate and also received his master's degree from Technology. He is known to his friends as Robbie. For information on my activities, you will find a lot of junk in *Who's Who in America* and in *American Men of Science*. I can relieve you from the misery of picking out the things appearing on the printed page after recovering a little from the effects of being father of the bride. I finished 25 years as secretary of the Cleveland Health Council and for 17 years have been director of the Cleveland Real Property Inventory, another non-profit corporation." The clipping he sent carried a picture of lovely Patricia Anne.

Merrill E. Pratt wrote an interesting letter as follows: "This acknowledges receipt of your letter of March 21. If I have any good characteristics, I would not consider telling you what I have done since leaving the Institute as one of my better ones. However, I will give you the best I can. After graduating in 1916, except for a period of service in the Army of World War I, I have spent my life with Continental Gin Company. I was elected president of the company in 1938, in which capacity I still serve. We are manufacturers of cotton ginning machinery and also conveying, elevating and materials handling equipment, the latter being a line we have developed since 1936. As hobbies, I like to play golf; possibly, I had rather talk about it than to play. I am married, have two children and three grandchildren and am not as young as I was sometime back." When we acknowledged Merrill's letter we assured him there would be plenty of golf at the 1951 reunion. If any of you were wondering the same thing, this will answer that query.

We were beginning to get a bit discouraged on responses and returns to our continued letters of request for news during this month, but were brought back to normal with a fine long letter from Professor Murray Horwood just before our time deadline. He has had a distinguished career at Technology and many of us know the high regard in which he is held. He writes: "May I state first that after being affiliated with the Department of Biology and Public Health at M.I.T. from 1916 to 1944, I was invited to become a member of the Department

of Civil and Sanitary Engineering at M.I.T. because of certain administrative changes which took place in Course VII at that time. My work had been largely in sanitary bacteriology and public health with particular emphasis on public health engineering, and Dr. Killian felt that it would be desirable to combine the sanitary engineering program in Course I with the public health engineering program in Course VII. Accordingly, I have been a member of the sanitary engineering division of the Department of Civil and Sanitary Engineering at M.I.T. since 1944 and have been responsible for the work in sanitary bacteriology, sanitary science and public health administrative practices. We have a set of new and exceedingly well-equipped laboratories that are named in honor of Professor Sedgwick which are known as the William Thompson Sedgwick Memorial Laboratories in Sanitary Science. Besides carrying a normal teaching load and engaging in research, I have had the good fortune to be associated with a number of outside activities. For example, I have served as consultant in public health engineering to the Boston Health Department since 1941. I have also served as consultant to Atlantic Gelatin, Division of General Foods Corporation, in matters pertaining to sanitary bacteriology, sanitation, nutrition and various other biological aspects. In addition, I have also been director of the food sanitation service at M.I.T. and have been responsible for the sanitary supervision of the three large dining services at M.I.T., at Walker Memorial, at the Graduate House, and at the New Dormitory. In addition, I have also devoted considerable time to service on executive committees of various professional and community public health and welfare organizations. Just now, I am busy preparing a substantial paper on 60 years of progress in sanitation which I have been asked to present before the April meeting of the Massachusetts Public Health Association in honor of the 60th anniversary of the founding of this professional society. I am hoping that it will be worthy of publication at some future time.

"As you might expect, my small family has grown up and have become adults. The oldest, Louise, graduated from Bryn Mawr College in 1944, and after serving as intern in a graduate program of the National Institute of Public Affairs in Washington, she was employed by the State Department for over two years. She married Charles S. Alden, a Haverford student, in 1947. They are now residing in Cambridge where Seymour is completing his work for the Ph.D. degree in history at Harvard while Louise is teaching at the Belmont Day School. Our second daughter, Charlotte, graduated from Radcliffe College in 1949, having specialized in government, and has been taking graduate work in government at Columbia University this year. She expects to be awarded the M.A. degree in June. She has just been informed that she has been admitted to the class entering the Harvard Law School in September, 1950. This will be the first class at the Harvard Law School to admit women and she is naturally quite thrilled over the distinction that has come

to her. Our youngest; namely, our son Sargent, graduated from Phillips Exeter Academy in 1948 and is now finishing his sophomore year at Harvard College. He was terribly anxious to go to Leland Stanford University but the great distance between Palo Alto and Cambridge and the expense involved in bringing him back and forth across the continent more than once a year pointed to the necessity of studying nearer home. Sargent does not expect to pursue a career in science, much to my regret, but will, undoubtedly, make his mark in the field of human relations. He has just won the competition for assistant varsity manager of the Harvard football team during his junior year which means that he will automatically be manager during his senior year. Naturally, he was thrilled over his good fortune. Having mentioned all the members of my family excepting Mrs. Horwood, who is the most important member of all, it would be neglectful on my part not to say a word about her. At present she is serving as chairman of an M.I.T. committee of faculty ladies in charge of the supervision of the M.I.T. Women's Dormitory on Bay State Road. In addition, she has also been serving as chairman of the program committee for the Boston City Women's Club besides running her home and looking after the detailed needs of each member of her family."

Earle Pitman, whose stationery is headed "Consulting Chemist and Chemical Engineer," Camden, Maine, wrote that: "... after 24½ years with the Du Pont Company, I left them in order to live in Maine, as I have always intended to do. Meanwhile, I have done more or less consulting work for various concerns, mainly engaged in the manufacture of finishes and adhesives. Last summer, I spent several weeks in England and Scotland at various plants of Imperial Chemical Industries, Ltd." It was good to hear from Earle and we are glad he has settled in Maine, where no doubt he is very contented and happy. How's the fishing and hunting, Earle?

And Joe Barker comes in for further mention. Here's how the New York Times put it, with a picture of him on the financial page of April 10: "Dr. Joseph W. Barker has been appointed a member of the advisory committee of the Grand Central branch of the Chase National Bank, the bank has announced. Dr. Barker formerly was a member of the faculty of Massachusetts Institute of Technology, Lehigh University and Columbia University. Since 1945 he has been president and chairman of the executive committee of the Research Corporation, a nonprofit institution which administers patents, extends research grants and manufactures electrical apparatus for smoke abatement and raw material conservation."

We regret to report the death of Charles F. Horan, a resident of Newton Center. Charles was at one time a member of the faculty at Harvard School of Public Health. He was a vice-president and general manager of the Arrow Mutual Liability Insurance Company of Newton. Our deepest sympathy is extended to his wife and daughters.

We have received another informative folder (Release B No. 47) from Dick Berger on cancer prevention, under the title "Let's Have Cancer Prevention Instead of Cancer," issued by Richard A. Berger Research, Inc., Bridgeport 4, Conn. Dick has spent much of his time during the past 15 years on research. To sum up: "Our intake of known dangerous cancer-causing irritants, such as coal tars and oil tars from smoky air, coal tars and oil tars in and on our foods, and tobacco tars from the widespread smoking habit, is increasing constantly." He calls attention to the recent publicity of tobacco as a causative factor for cancer in the *Reader's Digest*, which "finally blasted the situation wide open with its admirable article in the January, 1950, issue." This material really makes you stop and think. If you want some detailed information, Dick will be very glad to supply it.

We want to repeat that the dates for our 1951 reunion are June 8, 9 and 10. Make a mental note of these three days. We are counting on you to be present. We will give further details as soon as they are known and are definite.—RALPH A. FLETCHER, *Secretary*, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

• 1917 •

Al Lunn reports his enthusiastic team of '17 men is doing a good job on soliciting funds for the Development Fund from the local crowd with the result that we are to date making a creditable showing.

Duncan MacRae is associated with the Graduate Training Program in chemical engineering being conducted by the Army Chemical Center at the University of Maryland.—Harold Morse has announced his candidacy for the Water and Sewerage Board of Swampscott with the noble statement: "I am not a politician. I am a civic minded citizen interested in town affairs."—We note from a recent issue of the Newark *Evening News* that General Leslie R. Groves, "one of the nation's experts in the field of atomic power," was scheduled as one of the speakers on a forum program in Newark.

At long last we have some news on Bill Eddy. He recently retired as president of the Boston Society of Civil Engineers. Emil Gramstorff is junior vice-president of the same organization and Gram, who is head of the Department of Civil Engineering at Northeastern University, is also in the news as a member of a recently appointed group to act as special consultants to the Massachusetts Special Commission on the Structure of the State Government.

If any of you have need for a good eye [Ed.: of humans, not potatoes] knife, communicate with Rudolph Beaver, Waltham 54, Mass., for Rudy has at last developed, by his own admission, the best such gadget on the market. The blades are removable and interchangeable and a set of wrenches to do the trick costs only 30 cents.—RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, *Assistant Secretary*, 24 Federal Street, Boston 10, Mass.

According to a release from the Public Information Office of the Army Chemical Center in Maryland, Professor W. J. Huff, chairman of the division of physical sciences of the University of Maryland, on behalf of that University, announces the appointment of Professor Harold C. Weber '18 as a special lecturer on the faculty of the University of Maryland. Without relinquishing any of his duties as professor of Chemical Engineering at M.I.T., Professor Weber will visit at the Army Chemical Center from time to time and confer with members of the faculty of the University of Maryland on the development of the program of instruction in chemical engineering at that center. He will also give a series of lectures and participate in the conduct of classes and seminars in chemical engineering there. Harold Weber is especially well qualified for this work due to his eminence and long experience in the field of chemical engineering. His textbook on chemical engineering thermodynamics is well known and is used in many universities throughout the country.

In addition to his thorough knowledge of chemical engineering, Weber has an extensive familiarity with the chemical engineering problems of the National Military Establishment. He was technical adviser of the commanding officer of the Chemical Warfare Service Development Laboratory at M.I.T. during the recent War. He is a member of the American Chemical Society Committee Advisory to the Chemical Corps, and has been interested in its problems since his participation in its research and development program in 1918. These courses in chemical engineering and the courses in chemistry and the biological sciences develop a program for training civilian employees of the Army Chemical Center for a better performance of their present duties and for promotion to positions of greater responsibility. Only permanent employees who expect to remain in the government service are eligible to participate. The program is now in its second semester. Ninety graduates have registered. Of these, 40 are enrolled in the College of Special and Continuation Studies of the University of Maryland, and 50 in its graduate school.

By a recent action of the State Legislature, Albert Haertlein'18, Professor of Civil Engineering, Harvard University; Emil A. Gramstorff'17, Head of the Department of Civil Engineering, Northeastern University; and Walter C. Voss'32, Head of the Department of Building Engineering and Construction, M.I.T., were "appointed as special consultants to the Massachusetts Special Commission on the Structure of the State Government."—Grandpa Bill Wills is having himself a time these days drawing delightful quick sketches of grandson Richard Barry Wills, born in July of two years ago. Richard has a sister Nancy who joined the family last March. She isn't quite ready to pose for Grandpa yet, but Grandpa is keeping his pencils sharp against the day when she will want to play "peek-a-boo" and he must be brisk in order to catch the gleam of dancing sunshine through parted



little fingers.—GRETCHEN A. PALMER, Secretary, The Thomas School, The Wilson Road, Rowayton, Conn.

## • 1919 •

Harold W. McIntosh writes: "Now in 5th year in Pittsburgh with American Window Glass Company as manager, Technical Department. Have a son in college and a married daughter who made us grandparents last October. We lost our oldest son during the War. Whenever any classmates are in town, they will be very welcome at 657 Beverly Road, Mt. Lebanon, Pittsburgh, Pa." William R. Osgood has recently accepted a position as senior research engineer in the Applied Mechanics Department of Armour Research Foundation. His new address is 5236 Cornell Avenue, Chicago 15, Ill. Speedy Quick writes that he is now peddling paint for Gilmore Paint and Varnish Company of Chattanooga and is on the road most of the time; hence, missed H. E. Lobdell '17 when he was in his home town, Birmingham, Ala. His new address is 2108 White Way.

Philip L. Rhodes writes that ever since graduation he has followed shipbuilding and kindred engineering. Joined forces with Cox and Stevens, Inc., some 20 years ago as naval architect. On Mr. Cox's retirement three years ago, he took over the business and is now operating in his own name at 11 Broadway, New York City. The work includes yachts and pleasure craft of all kinds, as well as commercial vessels. He has had no opportunity to lose sight of institutions of higher learning as all three of his children are in college at this time. Alan G. Richards, now connected with Dewey and Almy Chemical Company, of Cambridge, Mass., writes that recently he had lunch with Ernest Voss, Chief Engineer for Humble Oil Refinery, while he was in Houston, Texas, and it was quite an enjoyable experience discussing old times. His further comments were that although he did not see Ernest dressed in cowboy boots and big hat, he was quite sure that he has at least several sets of them at home since he has been so many years in Texas.

The following is an excerpt from a note sent in by Walter C. Voss, Head of the Department of Building Engineering and Construction: "Under the laws of the State of New York which recently established the New York Building Code Commission of which Edward J. McGrew, Jr., '26 is chairman, John O. Merrill '19, Skidmore, Owings and Merrill; Ralph E. Winslow '24, Professor at Rensselaer Polytechnic Institute; and Walter C. Voss '32, Head of Department of Building Engineering and Construction, were appointed as members of the five-man board of consultants to assist in the formulation of a State Code."

We were all sorry to learn of the death of our good friend, Arthur Griffin. The February 26 Boston *Advertiser* and the Boston *Globe* carried the following information. Art was 56 years old and president of John F. Griffin Company, building contractors of Cambridge. He was born in White Plains, N.Y., and prepared at Chauncy Hall School in Boston.

The April 7 issue of the New York *Times* carried a story about Harry A. Kul-

jian and his revolutionary device for the spinning of rayon. Harry was associated with the American Viscose Corporation and he was later president of the Kuljian Corporation, an engineering firm.—EUGENE R. SMOLEY, Secretary, The Lummus Company, 385 Madison Avenue, New York 17, N.Y. ALAN G. RICHARDS, Assistant Secretary, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

## • 1920 •

By the time you read these notes, you will have had all possible news of the 30th reunion so I shall not attempt to cover any of this here.

At the April meeting of the Committee on Financing Development, 1920 was well represented by the following: Tony Anable, the Bugbee twins, Al Glassett, Ernie Huntress, Pete Lavedan, Bat Thresher, Ernie Whitehead, and, yes, we might as well claim George Dandrow as we are counting on him to be with us at the reunion.

As readers of The Review already know, the Class is honored by the election of Pete Lavedan as term member of the M.I.T. Corporation. As president of the Liquid Carbonic Corporation, Pete has been located in Chicago for a good many years but we understand that he will be in New York a good deal from now on. Among his many activities and distinctions he is honorary secretary of M.I.T. for Chicago and a past president of the M.I.T. Club of Chicago. He is a credit to the Class in every way, including his sprightly and youthful appearance.

It gives me great pleasure to report the arrival of a new Class Baby, Peter Hamilton Farrow, son of Ed and Marnie Farrow, born March 18. The "Hamilton" is for Ed's friend, Ham Wood '17. Ed says: "While most of the other 1920 men seem to be busy becoming grandfathers, I have tried to keep the average of the Class on the youthful side." He certainly has succeeded.

Ed Cochrane has received the Order of Yun Hui (Grand Cordon) conferred by the Chinese government. Ed, as you know, is a vice admiral, U.S.N., retired, and heads the Naval Architecture and Marine Engineering Department at the Institute.

Bruce Steele was married at Northampton on March 4 to Mrs. Lois Curtis of Burlington, Vt. He and Mrs. Steele will make their home at 39 Cliff Street, Burlington, Vt. Bruce was associated with the General Electric Company for many years and is now treasurer of Burmont, Inc., Burlington and of Monger Holding Corporation of Herkimer, N.Y. Robert N. S. Baker has been promoted to the rank of commodore and is now living in Haverstown, Pa. Hymen Bell is in Revere, Mass., address 247 Campbell Avenue. Phil Byrne is with the Standard Oil Development Company, Linden, N.J. Frank Foley is in Chicago and may be reached at 1620 Bankers Building. Al Greene is in Washington, D.C., address 2401 Calvert Street, N.W. Lieutenant Commander James Griffith is in Seattle, Wash. Johnnie Lucas, who is with Ford, Bacon and Davis, has moved from Chicago to New York.

## • 1921 •

It is with sorrow and regret that I must report the passing of three classmates: Joseph Gelders of Berkeley, Calif., on March 1, Fred Pelton of Los Angeles, and W. Porter Pratt of Quincy, Mass. Dr. Pratt died in August, 1948, but we had received no prior notice. Fred Pelton had been with the Association of Motion Picture Producers.—HAROLD BUGBEE, Secretary, 7 Dartmouth Street, Winchester, Mass.

Ernest Henderson and Robert L. Moore, President and Vice-president, respectively, of the Sheraton Corporation of America, one of the nation's three leading hotel chains, are "mine hosts" to M.I.T. Alumni at this Alumni Day Banquet in the Sheraton-owned Copley Plaza. Although we have devoted considerable space in this column to the activities of this versatile and far-seeing pair, the large volume of news that appears every month about them and their outstanding hostelries continues to clamor for attention. From our office windows, a visible reminder at the Battery is the long famous landmark on the harbor skyline, the Whitehall-Sheraton Building, atop which the Weather Bureau flies the bunting of its good weather-making, ignoring recent artifices to bring rain to Broadway. *Business Week*, the New York *Herald Tribune* and the Newark *Evening News* all report major transactions which now net the Sheraton chain 31 hotels in 27 United States and Canadian cities, plus four sizable office buildings and an industrial property, totaling sixty-five millions in assets. Together with Bob, his long-time associate, Ernie is called the "master welder" in building the chain on a long-range plan, involving a comprehensive sales job and the economy of large-scale operation to maintain top service and the highest standards in the business. For a good time on Alumni Day, June 12, come to the informal class gathering at the Copley Plaza and enjoy hospitality at its best from 4:00 to 6:30 P.M. in between the day's activities and the banquet.

John Barriger is another man of action whose doings are accorded frequent country-wide billing. In one month, we have a *Railway Age* report of Jack's address on the "Economics of Railway Operation," illustrated with a picture of him presenting it to the Chicago convention of the American Railway Engineering Association; an article he wrote on business and finance for the *Commercial and Financial Chronicle*; a report of the annual meeting of the Chicago, Indianapolis and Louisville Railway Company which re-elected him president; and a financial note on the Monon's securities. As evidence of his remarks that "there probably never was a generation of railway managers more able and willing to work to utilize their opportunities to improve technical and operating standards and reduce unit costs," Jack points out that his Hoosier Line was the first Class I railroad to become 100 per cent dieselized. He says: "We must all constitute ourselves 'vice-presidents' in charge of what shall we do tomorrow' to translate sound visions of future necessities . . . into practical realities," but he modestly refrains from claiming the credit

for the Monon's high speed on the road to prosperity through rapid rehabilitation of its property and significant advances in service standards, morale and public relations under his distinguished leadership.

Members of the Junior League of the Class continue to win fame in their own right. The Dean's List recently issued by the Institute for the fall term, carries two names of the younger generation among the second year students who have attained high scholastic standing. Richard F. Jenney, son of Mel Jenney, and Robert M. Lurie, son of the late Joe Lurie, are to be congratulated for maintaining the honor rank for both of their years at Technology. Through your votes, Chick Kurth has been returned to office as our representative on the Alumni Council. The crowded meeting of the M.I.T. Club of Northern New Jersey that heard Cyrus S. Ching speak on labor matters, was attended by a group including Mor Aronson, Sumner Hayward, Fred Kowarsky, Joe Wenick and your Secretary.

Everett J. Wilson is receiving congratulations on his appointment as superintendent of the Malden and Melrose Gas Light Company. Writing from his new home in Melrose, Ev says: "My family is now at the most interesting stage. Betty is in her third year at Vassar, majoring in mathematics. Jim, who is at Bowdoin, was graduated last June from St. George's School, Newport, R.I., where he received the mathematics prize as well as being named the outstanding athlete of the class. Our youngest, Frank, is a sophomore at Melrose High." Ev sent an excerpt from *Contact*, which we presume is the house magazine of the New England Electric System, telling of his advancement. Ev is a native of Newburyport, Mass. He joined the Providence Gas Company after receiving his degree in Course II. In 1926, he became advisor to C. H. Giest of Philadelphia and was engaged in operating gas plants and inspecting new construction. In 1928, he became an operating engineer for United Engineers and Constructors, Inc., on water gas, producer and coke oven plants. He became superintendent of the Bangor Gas Light Company in 1930 and two years later joined the Newport Gas Light Company in the same capacity. Since 1946 and until his new appointment, he has been a member of the Gas Engineering Department of the New England Service Company. He is a member of the American Gas Association and New England Gas Association and has given a series of educational lectures on gas topics.

In the service, Harvey C. Allen, a brigadier general, has an assignment in San Antonio, Texas, and John M. Johnson, a colonel, is now in San Miguel de Allende, in the State of Guanajuato, Mexico. Oliver L. Bardes, President of the Bardes Forge and Foundry Company, has a new home at 1833 Keys Crescent, Cincinnati 6, Ohio. New addresses have also been received for Raymond C. Fisher, Willard A. Fleming, Winfred L. Foss, Palmer W. Griffith, Francis J. Keenan and Robert P. Kite. A note to Arthur G. Wakeman about his move from Appleton, Wis., brought a prompt reply from him: "At the present time I am executive vice-president of the new Coosa River Newsprint Company which

has just been finished and put into operation here at Coosa Pines, Ala."

David O. Woodbury, author, lecturer and playwright, has added building construction to his other attainments. Writing from his new California home, Dave says: "Yes, it's finished and we're in it; an engineer's dream of a house, complete with one and one-third acres of land and a mortgage good for 15 years. But I find myself slightly nose-upturned about the troubles related by Eric Hodgins'22. Like the second Mrs. Tanqueray, the second Mr. Blanding hasn't experienced such insurmountable difficulties. I suspect that Blanding No. 1 set the stage just a bit, thinking there might be a best seller in being a slight dope about building. I guess he has found it paid off. In my case, knowing that there would be no best seller, I proceeded with care and the utilization of whatever engineering knowledge I may have retained over 30 years. Note for prospective homebuilders: Do your own architecting; do your own contracting. At least that's what we did and with remarkable success.

"There's really nothing to designing a house. Simply make a sketch of what you want, then get a draftsman to make formal drawings. Then hire some people to nail it together. Incidentally, in California you get somebody who knows the building code and can make the plans conform to the million or so limitations and requirements. You can't even build a chicken coop out here without conforming to the code. Anyway, we got a man who did know the requirements; and, barring the fact that a few dozen of them had been amended since he made the plans (so that the drawings had to go back two or three times for rechecking, each time at a fee) we came out whole and finally completed the job well under the minimum estimate.

"The secret? We took over the responsibility of co-ordinating everything—a service for which a contractor charges about 15 per cent of the price of the house. We bargained incessantly with carpenters, plumbers, and so on, chased nails, lumber, glass, cement and whatnot and generally devoted the major part of three months to the effort. Also, we were on hand continuously to decide little questions of architecture. On the whole, it was a demonstration that the average family can do a whale of a lot for itself if it is so minded. We think the demonstration has some value somehow, in a world of people expecting more and more to be done for them.

"Outside of home building, I have been experimenting with a return to engineering as a consultant to an organization in Burbank called Century Engineers. We are in process of establishing a group of about 50 engineers into a co-operative venture to exploit inventions originated by the group. Have about 90 ideas so far and expect to develop and sell about six to manufacturers the first year. We think the scheme has possibilities since most of the members are top engineering executives with long records of original work during and since the War. As it happens, the first invention to go through, as a sort of guinea pig, was my small portable

projection machine for making screen drawings while lecturing. It went to Bardwell and McAlister of Burbank. We now have the pilot model finished and will soon be in production. Sales are expected to be made to schools. The Pasadena and Los Angeles school boards have already accepted it. I have not altogether forgotten writing. The Review for May carried a biographical sketch of Edward Weston by me—a follow-up of the book I wrote about him, published last November by McGraw-Hill. The May issue of *True* magazine also carried a story about one Bill Harper, a police physicist of Pasadena. This also appears in condensation in the June *Reader's Digest*. I'm also at work on other Digest pieces, notably one on Bing Crosby's research foundation. At the moment I am chasing data on the fantastic Arizona-Colorado irrigation project, the billion-dollar Reclamation Service boondoggle, and on the fabulous Lost Pegleg Mine in the Imperial Valley. Put down my new address, 513 Knight Way, La Canada, Calif., as a place for any wandering member of the Class to stop off."

As we go to press, Saul Silverstein has hit the big time again. *Business Week* for April 22 features the many service ideas of Saul's new First National Bank of Manchester, Conn., in an article entitled "How Do You Start a Bank?" Pointing out the complex and tedious course necessary to open a national bank and stating that not one new bank has opened in New York State for some 20 years, with only 124 national banks being chartered in the entire country since the War, the article favors the "Southern California" approach and says the First National "has all the frills." It continues: "Employees' uniforms match the green and cream of the interior color scheme. Soft music plays in the lobby. Phones don't jangle—colored lights flash instead." Illustrating some of the 35 special services which have brought the total deposits to almost one and one quarter million dollars within two months of its opening, are photographs of left-handed check books, an automobile drive-in window, give-away paper umbrellas for rainy days and the pomp and ceremony of the opening exercises, attended by the town fathers and most of Manchester.

It is with heavy heart that we report the passing of three members of the Class and extend to their families our sincerest sympathy. John D. Crowley of Orange, Conn., since 1929 the owner and manager of the Equipment Engineering Company of New Haven, died on February 27 after a year of illness. A native of Fall River, Mass., he was graduated from Durfee High School there and was associated with us in Course II. In undergraduate days he was active in the Mechanical Engineering Society, the Aero Society and the Class Wrestling Team. He had been a faithful attendee at the last several class reunions. He joined the Navy unit at M.I.T. in the first World War and, for three years in the last War, he was a major of Army Ordnance assigned to the Air Forces. Before starting his own business 20 years ago, Jack had been an industrial equipment engineer with the U.S. Rubber Company in Naugatuck, Conn. He was service officer of Orange Post 127, American Legion,



former vice commander of the New Haven Yacht Club, a thirty-second degree Mason of the Day Spring Lodge, and a member of the Quinipiack Club, Edgewood Club, Orange Square Club, Milford Yacht Club, New Haven Power Squadron and the Potatuck Fishing Club. He was also a member of the Orange Volunteer Fire Department. Jack lived in a two-hundred-year-old red farmhouse, off the Merritt Parkway, in the modernization of which he and Mrs. Crowley had taken great pleasure. There he operated a small farm and orchard and spent leisure hours in sailing and fishing. He is survived by his wife, Mrs. Florence Rose Crowley and a sister, Mrs. Roger Simpson of Albany, N.Y.

Stephen Eastman Root, formerly of Concord, N.H., died on March 12 at Montreal, Quebec, where he was associated with the Foundation Company of Canada, Limited. Born in Rochester, he was associated with our Class in Course II and later received an engineering degree at McGill University, Montreal, where he was a member of Delta Upsilon. Following association with the Brown Company at Berlin, he became chief engineer for the E.R.A. in Concord in 1934. He was married in 1935 to the former Ellen Griffin of Concord. Surviving are a son, Stephen E. Root of Concord, now a student at Proctor Academy, and a brother, Howard W. Root of Nashua, N.H.—The Alumni Office has received word of the death at Bradford, N.H., in July, 1941, of Dustin Greeley Cressy, who was associated with us in Course X. No further details are available.

Don't forget to bring your movies or stills of past events to the Alumni Day class meeting to be shown along with Bob Miller's photographic history.—CAROLE A. CLARKE, *Secretary*, International Standard Trading Corporation, 67 Broad Street, New York 4, N.Y.

## • 1922 •

Samuel M. Seegal, Vice-president and Merchandise Manager of William Filene's Sons Company was elected a member of the corporation of Faulkner Hospital, Boston, at the annual meeting of the board of trustees on March 31. The Faulkner Hospital, organized 50 years ago, is a voluntary institution serving Greater Boston residents.—Francis M. Kurtz appeared before the Senate Agricultural Subcommittee in March to inform them of the coffee situation. We are glad to note from the Newark *Evening News* that our classmate utilized some of his Technology training at this hearing. The *News* said: "A precise man who whipped out a slide rule to help him answer some of the questions, Kurtz objected when Senator Holland once referred to A. & P. as a 'cheaper coffee.' 'Excuse me, senator,' he said, 'I don't like that word. I prefer to say it is a lower-priced coffee.'" The report continued in a tone that indicated that the subcommittee was questioning a man who knew his facts and could not be kicked around.

New addresses: James H. Compton, 66 Norton Street, New Haven, Conn.; William R. Deeble, Vineyard Haven, Mass.; Hobart A. Fischer, 18 Rockland Street, Concord, N.H.—At the April 22 meeting of the Committee on Financing Develop-

ment, the following members of the Class were present: Fred Blackall, George Dandrow, Warren Ferguson, Brod Haskell, Ab Johnson, Dunc Linsley and Paul Ryan. Dunc Linsley, chairman of Region 2, reported for New York, while Paul Ryan gave an excellent talk on the question of corporation solicitation and procedures.—C. YARDLEY CHITTICK, *Secretary*, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N.Y.

## • 1923 •

This is the final notice of the annual meeting of the Class which will be held at 5:00 P.M. on Alumni Day, June 12, at the Copley Plaza prior to the Alumni Day dinner.

The Chelsea, Mass., *Independent* wrote a local-boy-makes-good story on February 25 about Benjamin Cooper. It tells of a device, for which Cooper is responsible, that will collect tolls on the Mystic River Bridge serving Boston, Chelsea, and other nearby cities. Sherman R. Hoyt is a member of the Board of Representatives of the city of Stamford, Conn., and was appointed in March a member of the City Planning Board. Hoyt is associated with the United Dyewood Corporation of New York City. Robert T. Colburn received the award of the hydraulics section of the Boston Society of Civil Engineers in March for a paper entitled, "Headaches from Treatment of Combined Industrial Waste and Sewage."

Information about the decease of two members of the Class has come to me from the Alumni Office. Michael J. P. Pattis, a graduate of Course VI, died on February 13, 1947. Cornelius E. Harrington of Millbrae, Calif., also of Course VI, died on May 14, 1949. I regret I have no further information about either.—HORATIO BOND, *Secretary*, National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, South Broadway, White Plains, N.Y.

## • 1924 •

Our other traveling secretary, Bill MacCallum, now operating from his Los Angeles base, stopped by the other day for lunch. Bill is one of the C.F.D. boys in that area, working with Rock Hereford and Archie Carothers among others. Rock, it seems, shuttles back and forth between Los Angeles and Omaha in the process of supplying cars and spare parts to the Union Pacific. SOCIAL NOTE: On February 18 last, the C. Mortimer Phelps' of Philadelphia stopped off to see the W. Henry MacCallums en route home from a winter vacation in Hawaii, made a quick tour of Hollywood and Beverly Hills, wound up with a party which celebrated their 19th wedding anniversary. The Rockwell Herefords completed the attendance at this gay affair.—Another regular commuter, Carlo Vicario. Vic has a project going on in Canada, runs up there from New York week ends to look things over. George Parker is now located on State Street in Boston with Anderson Nichols

and Company, consultants. The National Association of Home Builders has a new president, Thomas P. Coogan. Tom went to Florida in the mid-twenties, has been there ever since. For some time he has had his own company in Miami, building low-cost housing. He is past president of the Builders Association of Southern Florida, has been a director and regional vice-president of the National Association of Home Builders for the past three years. Any of you who are planning to retire in Florida better make a note.

Another one of our "lost" classmates turned up via a news item. Benjamin J. Bean, sales manager for the Worcester Gas Light Company has been living right nearby in Grafton for the past 19 years. Reason for the clipping: he is a candidate for library trustee. Since he's been one for the past 10 years, the prospects look good!—When Harold P. Kurzman sent in his questionnaire for our class book he gave as his occupation "President, Manufacturing Company." Now it turns out the manufacturing company is Lily of France, Inc., which company he joined in 1939, becoming president three years later. A past president of the Corset and Brassiere Association of America, he has just been named a director of Brand Names Foundation. That makes a couple of old Tech Show boys who have done all right supplying essentials to females—he and Sam Zerkowsky. And I suppose you could make that a trio with Hood Worthington—after all, nylon has become fundamental.—CHANGING TIMES: Here's a self-explanatory comment on the Far Eastern situation. A change of address memo from the Alumni Register: James C. L. Wong '24—old address, Hong Kong, China; new address, Hong Kong; memo, China removed!

We told you about Bill Rosenwald's multitudinous activities not long ago. Now comes a feature story from the Philadelphia *Inquirer*, "No Badge of Ease on Mr. R." And it's headed by a three-column picture of a shirt-sleeved Mr. R gaily waving a ten-gallon hat while riding a full sized rocking horse! It was all in a good cause though, entertaining displaced children at Coney Island. Bill gave a quick run down on how he divides his time: "I spend half my time in philanthropic work, half at business, half with my family, and half at personal affairs." Good old Course XV! They certainly teach you to do the darndest things with figures.

Sometime soon, you will get a list of our "lost" classmates, with the hope that you can help in picking up some of them. You will remember that a considerable number, about 100, appeared in our 25-Year Report without addresses. Here are a couple who just turned up: Charles F. Kniffin has been out of circulation for 20 years, as far as our records were concerned. He's been located in Chicago. And the post office has been returning mail addressed to William T. Grumley since 1929. Now he turns up in Norwalk, Conn. The smaller that list becomes, the better. APPOINTED: To the New York Building Code Commission, Ralph E. Winslow, Head of the Department of Architecture at Rensselaer. This five-man body (chaired by Edward J. McGrew, Jr., '26) is

to act as a consulting group in the formation of a state building code. ELECTED: Secretary of the M.I.T. Club of Honolulu, Samuel L. Graham. A civil engineer with the Civil Aeronautics Administration, Sam has been out in the Islands for the past 10 years or so.

Next month: The inside information on Alaskan travel by our representative in the 49th state. In the meantime, don't forget the class cocktail party, June 12, Copley Plaza Hotel, Boston, just preceding the Alumni Banquet. Time—anywhere from 5 o'clock on. It will be fun.—HENRY B. KANE, *General Secretary*, Room 1-272, M.I.T., Cambridge 39, Mass.

## • 1925 •

This will appear in the last issue of The Review that you will receive before the reunion, and appropriately, there is quite a bit of news. We'll start out with the clippings. From the Worcester *Telegram* of March 21: "Dr. Douglas V. Brown, professor of industrial relations at M.I.T., spoke on labor-management issues at a dinner meeting of the M.I.T. Club of Central Massachusetts last night at the Sheraton. Eighty attended the meeting at which Max Levine [II] '25, club president, presided. Donald P. Severance, secretary-treasurer of the national M.I.T. alumni association, spoke on recent developments at the Institute." Max is the owner of the Webster Spring Company of Webster, Mass. Accompanying the item is a cut of Max, Professor Brown, and Don Severance. Max has put on quite a bit of weight since his gym team days in the 20's, but who am I to speak! Wait until you see me at New London. Under the headline, "Science Pays Tribute to Lynn Admiral," the Lynn *Republican* of January 28 printed the item from which I quote in part: "Rear Admiral Theodore C. Lonnquest [S.M.'25] a native of Lynn and deputy and assistant chief of the Bureau of Aeronautics, Navy Department, was elected a Fellow at the Institute of Aeronautical Sciences in New York at the annual convocation recently. . . . Admiral Lonnquest . . . graduated from Dartmouth, where he was elected to the Phi Beta Kappa. He served in World War I as a lieutenant, USNR, transferring at the end of the war to the regular Navy. He is one of the few naval officers to hold ratings as a heavy (Sic) and lighter than air pilot. Adm. Lonnquest in 1922 graduated from the Naval Academy Postgraduate School at Annapolis, and . . . received a Master of Science degree . . . at M.I.T. He was responsible for the design and development of the Navy's wartime aircraft and airborne equipment and was instrumental in the revolutionary advances which have made the United States the greatest naval air power in the world. He was also on the staff of the Commander of Joint Task Force One, known as Operation Crossroad, the Atomic Bomb test at Bikini Atoll. Adm. Lonnquest holds the Legion of Merit, Victory Medals of World War I and II, and other campaign and area medals." While we are on the subject of the Navy, I had a talk the other day with Tom Kilian who is science director (civilian) at

the Office of Naval Research. We discussed the circumstances that brought us together in Washington, and agreed to meet at the reunion in June.

The New York *Journal of Commerce* of February 24 says: "Henry Sachs [V] who is associated with Frank Crystal & Co., Inc., brokers at 61 Broadway, has been elected a vice president, according to its president, Frank Crystal. Mr. Sachs, a native of San Francisco, was educated in Europe and New York and later was graduated from the M.I.T. with B.S. and M.S. degrees in Chemistry. A colonel in the organized Army reserve, Mr. Sachs received the Silver Star decoration for gallantry in action during the Japanese attack on Pearl Harbor. During the War, Col. Sachs was awarded the Legion of Merit and Army Commendation Ribbon citations for "outstanding safety work." He served in the Middle East and Mediterranean theaters in safety and storage work with high explosives." John B. Wilbur '26 Head of the Department of Civil and Sanitary Engineering at the Institute sent the following: "M.I.T. Civil and Sanitary Engineers were well represented at the annual dinner meeting of the Boston Society of Civil Engineers, the oldest engineering society in the United States. Retiring President, Harrison P. Eddy, Jr., '17, relinquished his gavel to his successor, Thomas R. Camp '25." The remainder of the item deals with members of other classes. Chink Drew sent me the following letter: "Have just received the latest issue of The Review. Where are the Class of 1925 notes? I know class members, including the writer, are not too prolific in writing but it seems no issue of The Review between now and June should be without copious notes and publicity on our 25th reunion. Incidentally, I am still with Schrader. Following is a clipping from a recent issue of the New York *Times*: 'Garvin A. Drew, General Sales Manager of A. Schrader's Sons, has been elected President of the New York Sales Managers Club. He succeeds Fen. K. Doscher, Vice President of the Lily Tulip Cup Corp.' See you at the reunion." I'm glad Chink got irritated by that issue without our notes, otherwise he wouldn't have written; but his plaint has been answered, I'm sure, by succeeding issues! Last month I took some space to report the marriage of my daughter. This month I can report the marriage of my son, a Course VI member of the Class of '53, to Anne Connors of Cambridge. The bride is a graduate of the Massachusetts General Hospital School of Nursing. The wedding took place on March 24 at the home of my brother, Perry H. Ware '35, VI-A, in Medford, Mass. We are now practically an all-Technology family: brother, son, son-in-law, and myself. I have another brother who went to Bowdoin, but I disclaim any responsibility for that!

Within a few days now your classmates will be gathering for their 25th reunion at the Griswold Hotel and Country Club in Groton, Conn. Are you planning to be there? And have you made your reservations? Although the deadline for reservations has already passed, I am sure a few more can be taken care of if they find at the last moment they can make it. Of course, we would like to have everyone

present from the afternoon of June 9 to the morning of June 12 and then have everyone come on to M.I.T. for the Alumni Day activities. However, if you can't be present the entire period, try to be present even if it is only a few hours. I am sure that the hotel can make arrangements to take care of persons attending the banquet only, or for any other portion of the entire period planned for the reunion. Certainly you have seen some names on the lists mailed to you of fellows you have not seen for many years and here is the opportunity to renew these acquaintances.

On Monday, April 17, we had the largest gathering of 1925 men since the small reunion get-together in 1945. Only the men in the immediate vicinity of Boston were notified of this meeting and 22 showed up at Walker Memorial for a cafeteria-style dinner and a meeting in the Silver Room following the dinner hour. Tables were reserved so that we could all eat together and enjoy each other's company.

Course I was best represented with the following in attendance: Hank Colby, Ed McLaughlin, Ken Lucas, Harold Robichau, Fred Rice, Ken Robie and Court Worthington. Course II was also well represented by Arch Nickerson, Bob Hodson, Frank Turnbull, Rusty Blair and Wally Squire. Others present were Sam Caldwell, VI-A, Ed Lynch, VI-A, Andrew Fassitt VI, Scott Emerson X, Clarence Thulin XIV, Ave Stanton XV, Greg Gregory XV, Cy Hosmer XV, Henry McKenna and Doc Foster III, your reunion chairman.

This large group was quite enthusiastic about reunion plans and made many worthwhile suggestions. It is fair to say that most of this group will be present at the reunion during some part of our stay at the Griswold. In connection with the reunion planning, we have received a nice letter from T. M. Lowe, II, Head of the Department of Civil Engineering at Alabama Polytechnic Institute, Auburn, Ala., as well as a letter from Ted Coyle XIV, Vice-president of the United Chromium, Inc. I hope to see you all at the reunion.—HOLLIS F. WARE, *General Secretary*, 106 Schuyler Road, Apartment 206, Silver Spring, Md. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

## • 1926 •

It's a bright sunny spring morning (6.30 A.M. to be exact) here at Pigeon Cove as I light up my corn cob and spread papers over the floor and divan in preparation for the next to the last batch of notes for this season. Under conditions like these, anything can happen to the notes, especially since I have neither the class register nor my old *Technique* for reference—in other words, I feel like rambling. Spring is here—yesterday the fishing season opened but that does not interest yours truly particularly because we are not hamstringed by game wardens or announced seasons. The fish control the seasons and since we specialize in flounders, it will be another month before there will be any point in lowering a sea worm to the sandy bottom of our harbor and six or eight weeks before the mackerel schools



arrive from no one knows where. Shortly after you read these notes, the huge tuna will schnorkel into the bay, and I'll be able to sit on my terrace with the binoculars and view a hundred or more tuna boats. With classmates Lou Berubé of the School of Fisheries up in Quebec, and Joe Bates, author of *Spinning for American Game Fish*, Little Brown and Company, I should be able to get some advice on how to catch more flounders than my pal, Gunner, who digs the sea worms and rows the boat. How about it, Lou and Joe—send me the instructions at Post Office Box 327, Pigeon Cove, Mass.

Bud Wilbur is here at the Cove this week end—staying at the nearby Yankee Clipper Inn. Guess he felt the need of some relaxation from the two full-time jobs he is now running, and this is the place to get it. He and his wife were over last evening, and we learned of their plans to move into the new Eastgate apartment that is being built on Institute property, mainly to house the staff. The apartment building has been described in *The Review* and will, doubtless, be written up again soon since it will be ready this summer. I'll just comment, therefore, that it will be super colossal and you can look for the details as they appear. We will return Bud's visit as soon as he moves in. Down in Reading, Pa., the Chamber of Commerce is a regional organization covering the whole of Berks County, and classmate, Jim Bamford, has recently been elected president, having served as vice-president for several years. Jim is the leader in civic affairs in that area, having served as executive director of the Berks County Community Chest since 1934 and his activities in the Chamber have been principally with civic problems. On the side, Jim is president of M. W. Bamford, Inc. By the way, Jim, I wish you would tell me how you can carry on all these activities without getting any gray hair for mine is nearly white. (Jim parts his in the middle like Bill Sessions.) Congratulations on your new post!

Roger Smith recently dropped into the office with his son, Neil, and took the Class Secretary out to lunch—let me repeat—took the Class Secretary out to lunch. Since I am currently cutting back from 193 to 180 pounds, please give 24 hours' notice so we can eliminate breakfast. Roger is in the juvenile furniture business in Gardner, Mass., and was in Boston for the furniture show. Roger is a real Yankee with his ingenuity. When you make furniture, you get sawdust, so Roger has developed a process for making trays from the sawdust bonded with resin and sandwiched between layers of special paper. Here's a note telling about the formation in 1948 of a new engineering group called the Audio Engineering Society and that one of the founders was C. J. LeBel '26 of Audio Devices, Inc. Mr. LeBel was the first president of the new society which grew so rapidly that at their first convention in October, 1949, there was a registration of over 3,000. Congratulations for a good job started, C. J. LeBel. From Rochester, N.Y., comes the announcement that Ward Hamilton, Director of Research for the Ritter Company, has been appointed commanding officer of the

1357th Military Government Group, a unit of the Organized Reserve Corp. Salutations, Ward—I mean Colonel Hamilton. (Time out—I must fill the corn cob again and this time fill the fountain pen, too.)

Whit Ashbridge has sent us some most interesting correspondence from Caracas, Venezuela, where he is located with Frederick Snare Corporation, contracting engineers. Whit has a unique system of writing to his relatives what might be considered a family newspaper; i.e., several carbon copies of the same letter are sent around, addressed "Dear Family." The two that I have received indicate that I may be on the mailing list from now on—at least I hope so, because they are most interesting. Whit, his wife Gurney and his oldest son, Dick (eight years) have been seeing the country, and I'm going to quote directly from one of his letters: "Last Sunday Gurney, Dick and I drove down to Higuerote, a small town on the sea coast about 100 kilometers or so east of Caracas. It was an interesting, although somewhat tiresome ride, most of it over dusty roads. We cooked a picnic lunch on the beach and Dick got into the water for a short time. Once one gets away from Caracas it is surprising to see how primitive things are. There was a great deal of completely unoccupied country with just occasional thatched huts with mud walls and dirt floors, not much if any better than those used by the Indians here in the interior or by the natives in the South Pacific. In fact, the houses that I saw on Guadalcanal were, I think, of better workmanship. The office was closed on Monday and Tuesday, the 21st and 22d, due to the carnival holidays. On Tuesday, Gurney, Dick and I took a train trip to Valencia just to see the country. We had already driven to Valencia, but the railroad line gives one some beautiful views and it is easier than driving. We took a picnic lunch along which we ate on the train. We had about an hour in Valencia, just enough to stretch our legs, then we returned on the same train. The word "train" is an exaggeration as actually it looked more like a bus. There were two classes, a first class in the forward compartment, where we had a very good view, and the second class behind. The line was certainly far different from the type railroad we are accustomed to in the States. It was somewhat narrower gauge, probably about one meter, very twisty as it went through the mountains and it gave us some beautiful views, although sometimes I had some qualms about the safety of the track. We went through 86 tunnels (they had them all numbered so we did not have to count them) and over 200 and some bridges. The bridges varied from substantial steel trusses to high spindly trestles. A high percentage of the trestles were built on curves of rather short radius which is very different from our practice. As we went around the sharp curves, I could not help thinking that the pressure of the swaying car against the rails was producing quite an overturning effect on the bridge, but remembering that a great many trains had passed over the same bridges for many years I decided that ours would probably not be the one to

knock over one of the bridges. In addition to the numbers, the bridges have fancy names, many of which were obviously connected with incidents during construction of the line. There were such charming names as "Solitude," "Araguatos" (red howling monkeys), "The Deer," "Yellow Water," and so on. There was, of course, one named after Bolivar and I was surprised that he had not rated one of the larger and higher bridges. There was even one named "Hell," so perhaps the construction group had a difficult time there. All in all, that was a very interesting trip and a far cry from the mainline of the Pennsylvania Railroad. There were some beautiful trees along the way in flower, including the bucare which has an orange blossom and the araguancy, the national tree of Venezuela, which has bright yellow flowers." Thanks a lot, Whit, just keep us on the mailing list, and I hope that your travelogues will become an inspiration to other classmates in far away places.

There must be a great deal of visiting among '26 men in connection with the Development Program, and your Secretary will appreciate receiving word from any and all of you after such visits. There are still some notes in my file but let's save them for next month—in other words, your Secretary has been writing for two hours, the corn cob has gone out again and there really is some work to do in the garden. So until the July issue, Cheerio!—GEORGE WARREN SMITH, *General Secretary*, E. I. du Pont de Nemours and Company, Inc., Room 1420, 140 Federal Street, Boston 10, Mass.

## • 1927 •

Believe it or not, further progress is being made on the 25th reunion scheduled for Friday to Sunday, June 6 to June 8, 1952, at East Bay Lodge, Osterville, Mass. Plans include many of us going to Cambridge on Monday, June 9, for Alumni Day. Bob Bonnar called a meeting of the '27 classmates in greater New York on April 5 and in a quick vote all present agreed to give Glenn Jackson, as chairman of the reunion, all possible support. Amongst those present were: Bob Bonnar, Glenn Jackson, Ray Bucklev, Tim Lyles, Dan Metzger, Ray Hibbert, Ernest Hinck, Sam Kaswell, Joe Melhado, George Saliba, Charlie Sanborn, Bob Tucker, Charlie Smith, Les Woolfenden, and Bud Fisher (I was in Memphis).

Quite aside from the general start promised by the above group, Glenn has made several definite appointments. Jim Lyles will be honorary chairman, and committee chairmen have been assigned as follows: class dinner and speaker, Bob Bonnar; class treasurer, Joe Burley; photography, Wheat Hutchison; 25-year book, Joe Harris; baseball, Ralph Stober; golf, Hinck and Stevens; entertainment, Ray Hibbert; transportation, Charlie Smith; mailing and correspondence, Les Woolfenden.—There will also be regional chairmen with Dyke Arnold covering Boston, Carl Davies the southeastern states, Dan Metzger the Philadelphia area, Pete Norton Massachusetts and New Hampshire, and Larry Van Mater western New York. Volunteers are needed for many other

## • 1928 •

areas. Write to Glenn Jackson, North Carolina Finishing Company, Cotton Division, 320 Broadway, New York. There are other committee jobs still available such as publicity, rooms, tennis, and so on.

All kinds of things have been happening to Deke Crandell. His marriage was recorded in the May, 1950, notes. We find now that he has received the annual Clemens Herschel Award of the Boston Society of Civil Engineers for his paper on "Ground Vibration due to Blasting and its Effect upon Structures." The award was made at a meeting of the Boston Society of Civil Engineers at which meeting our Robert W. Moir was elected secretary of the Society.

Moe Smith, after leaving Remington and Du Pont in 1948, became assistant in charge of manufacturing and engineering operations in the plastics department of General American Transportation Corporation in Chicago. In November of last year, he left this position to join the Bolta Company in Lawrence, Mass., as an engineer in charge of plastic molding operations.—The *Waltham News-Tribune* recently recorded that W. H. Nichols, former vice-president and chairman of the manufacturers' division of the Chamber, current chairman of the Boys' Club Building Fund Campaign, and member of one of Waltham's outstanding industrial firms, W. H. Nichols Company, was unanimously elected president of the Waltham Chamber of Commerce.—Captain Les Kniskern, formerly on duty at the Fall River Shipyard, is now commander of the Philadelphia Naval Shipyard.—Paul J. Harrington, who lives in Mountainside, N.J., has been appointed assistant chief engineer of the engineering department of the Standard Oil Development Company. He has been with Esso since 1929.—An office for civil engineering and land surveying was opened on March 4 in Westerly, R.I., by Horace Emerson. During the War he was chief engineer of the Westerly Air Base for the Navy.

Maurice Davier tells me I shouldn't be surprised to find that he has switched from Johns-Manville to Van Cleef Brothers as the latter is a subsidiary of the former. He is general manager of its Johns-Manville unit.—We have the following from Colonel Amos Akerman at MacDill Air Force Base: "On staff duty at Headquarters, New England Military District, Boston, from September, 1946, to August, 1949. Present assignment—Commanding Officer, 937th Engineer Aviation Group, MacDill Air Force Base, Tampa, Fla." Engineer Aviation units are manned by department of the Army personnel, but are on duty with the Air Force. Engineer aviation units maintain and repair airfields in the United States. In time of war they build airfields in overseas areas.—Howard W. Page now lives at 36 Queen Anne's Gate, London, S.W. 1, England, and is a director of Anglo-American Oil Company, Iraq Petroleum Company and its associated companies. In line of duty he divides his time between London and the Middle East.—JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York, N.Y.

Colonel John MacLaughlin is now associated with the graduate training program in Chemical Engineering being conducted at the Army Chemical Center by the University of Maryland. Colonel MacLaughlin is commanding officer of the Technical Command who takes an active interest in the program.—John Melcher has been given an interesting new assignment with the home office of his firm, Leeds and Northrup Co., in Philadelphia. He will be promoting the sale of instruments for educational and research work all over the country and expects to be on the road about half the time. John deserves much credit for the work he has put into the job of class agent for the Alumni Fund. His efforts have been responsible in a large degree for the fine showing our Class has made. Let's give credit where it's due—a salute to John Melcher!

Bill Phillips is now doing management consultant work (cost reduction, cost analyses . . . breakeven points, and so on). His address is Bethesda, Md. By the way Bill, thanks for your comments about the notes. If you have any additional news about the Class—send it along, we'll publish it!—Here's information about Charlie Southwick, Jr., taken from his letter: "I have recently been appointed to the Committee on Equipment and Material of the Research and Development Board of the Department of Defense. This appointment includes membership on the panel for packaging, packing and preservation. My normal activity is as a consultant on the technical phases of packaging and technical editor of *Modern Packaging* magazine." A full-page picture of Charlie (he doesn't look a day older) appeared in a recent ad for the Riegel Paper Company. It was headed "'Good Packaging Starts with Engineering' says C. A. Southwick, Jr. Packaging Engineer and Technical Editor of 'Modern Packaging'."

The Harleston Parker Medal, awarded each year by the mayor of Boston for the "erection of the most beautiful piece of architecture within the limits of Boston or of the Metropolitan Parks District" was presented to Isidor Richmond'16 and Carney Goldberg'28, both of Brookline and with offices in Boston, at the annual dinner meeting of the Boston Society of Architects. The citation, made at the affair held at the Harvard Club, was given in recognition of their work on Temple Emeth. The firm of Isidor Richmond and Carney Goldberg, architects and engineers, was formed at the close of World War II. They number among their commissions such buildings as Lamson and Hubbard, Boston; Boston English High School cafeteria; Newtowne Ct. Housing Project, Cambridge; the Chapel for Isabella Thoburn College, Lucknow, India; Temple Emanuel, Newton; United States courthouse in Hingham; and the United States Post Office in Brighton.

The *Syracuse Post Standard* carried the following interesting account of an hour of entertainment which Ralph Evans gave to the Technology Club in that city at a recent meeting. Ralph is head of color control for Eastman Kodak: "He showed with slides what can be done in the way of optical illusion on five feet of floor

space depth. He demonstrated that 'it's not your eye that sees, but your mind that interprets.' About 20 sea shells, placed naturally on the floor, were his main actors. Lighting and focusing alone gave a remarkable variety of difference in apparent depth. Focus on the near ones, and the far ones look twice as distant. Throw a blue light on the farther side, and you have the same effect. That's because nature teaches us to recognize blue haze as a signal of distance. Now put converging strips of white paper on the floor, and again the depth is heightened. But work against nature by putting horizontal strips across the floor, and at once your floor appears as a ceiling with the shells hanging head down. Mr. Evans concluded with a series of pictures taken from flat pieces of paper lying on a chessboard. He could fool you into seeing anything—all apparently in three dimensions, sound and solid. Only a shot taken from the side gave the whole show away. One of his photos showed a beautiful shell in a transparent box. But there was no box at all; just a shell on paper. 'This all goes to show what ease juggling can be performed,' he said. The practical value of it is, that it gives training to artists in producing effects. It isn't what you see, but what you think you see that counts."—GEORGE I. CHATFIELD, *General Secretary*, 49 Eton Road, Larchmont, N.Y.

## • 1930 •

A May wedding was planned by Webster Fisher and Jean Elizabeth Fiester of Rochester, N.Y. Web attended Bowdoin College before coming to the Institute. Our congratulations and best wishes!—In recognition of outstanding contributions to the science of corrosion, Robert Brown has been awarded the Whitney Award for 1950 by the National Association of Corrosion Engineers. Bob is chief of chemical metallurgy at Alcoa's research laboratories in New Kensington, Pa., where he has been employed since 1931.

Shortly after you read these notes, our 20-year reunion will be in full swing at Riversea Inn, Old Saybrook, Conn., on Saturday and Sunday, June 10 and 11. With Alumni Day at the Institute scheduled for Monday, June 12, it looks like a big week end for the Class of 1930. We hope to see you at one or both of these affairs! If you cannot possibly attend, why not drop a short note to one of the three undersigned so that we'll be able to tell the other fellows about your activities?—PARKER H. STARRATT, *Secretary*, 1 Bradley Park Drive, Hingham, Mass. *Assistant Secretaries*: ROBERT M. NELSON, 2446 Iroquois Road, Wilmette, Ill.; ROBERT A. POISSON, 150 E. 73d Street, New York 21, N.Y.

## • 1937 •

The following is from Rutherford Harris: "The Class Gift Committee reminds the members of the Class that, although temporarily overshadowed by the Development Fund Campaign, our program for raising a substantial sum as a cash gift to the Institute continues. Ours is a long-term program and is in no sense competitive with the Development Fund, which is largely to provide for more immediate,



substantial needs. As of this date we are well on our way to realizing our goal of \$100,000 in paid up insurance to go to the Institute 12 years hence at our 25th reunion. However, the support of each member of the Class is required to meet our goal. Those of you who have put our previous mailings aside for later action need only drop a card, ordering one or more units (\$500 each) to Rutherford Harris, 247 Greendale Avenue, Needham Heights 94, Mass." This committee is doing a very wonderful job and deserves all our thanks.

It's been such a long, long time since I have written a column and the only excuse I can give is that business is so good that it keeps me stepping.

The following are announcements of engagements. November: Virginia G. Elder to Goodwin de Raimes. I see by the marriage clippings that all the rest have said their vows since then! It surely has been a long time, especially when I see old news become obsolete by reshuffling clippings.—Marriages: A. Ruth Alpern to Edwin Kass on November 9, 1949; Sybil Greenan to Frederic N. Rolf on January 21, 1950; Christine B. Drake to Leo B. Moore on November 19.

The following is a list of our class members who lost their lives in World War II: David B. Bartlett, George T. Breitling, Lincoln R. Clark, Jr., John H. Gander, Robert F. Haggerty, Max S. Kendzur, Andre N. Laus, Robert Strauten, Edward C. Walsh, Charles J. Weschler, Elmer C. Wirtz, Jr. The Class of '21 is putting up a memorial to all the fellows who died during World War II and we would appreciate knowing if there are any omissions in the above list.

Here are a few changes in positions noted since last summer: T. Norman Willcox was appointed manufacturing and materials engineer of the Laminated and Insulating Products division of the General Electric Company in October, 1949. Last year, he won a Coffin Award, one of the high honors in the company. Coshocton, Ohio, is his new home. He has two sons, Thomas and John.—William B. Bergen was named chief engineer in complete charge of Glenn L. Martin Company's engineering activities.—Lieutenant Colonel Joseph A. Smedile, an instructor at the Air Command and Staff School at Maxwell Air Force Base, Alabama, is representing the Air University at the Army's first experiment in unifying all the services of supply, communication and transportation at Camp Lee, Va. Say—that happened last May! Also last May's news—Roger H. Wingate was named assistant vice-president of United Mutual Fire Insurance Company at Boston. William C. Wold opened his own consulting office at 500 Fifth Avenue in April of last year. Keenly interested in personal aircraft, he is pushing a plan to promote private aviation through motion pictures and television.

Civil Air Patrol Major James L. Camp was promoted to lieutenant colonel in March, 1949, and reassigned from duties as wing operations officer to deputy wing commander for Texas, CAP Headquarters at Hensley Field. Ray P. Rossman, formerly manager of the southwestern rub-

ber testing laboratories for Cabot Carbon Company, Pampa, Texas, was assigned to the Technical Service staff in May, 1949.

Well, some real hot news! Year, 1950: W. Gardner Barker is executive vice-president of The Simoniz Company, Chicago. Edgar C. Rust, Jr., has joined James Hunter Machine Company as assistant to the chief engineer. Vladimir Haensel, chemist with Universal Oil Products Company, is credited largely for the development of the process which improves the quality and yield of gasoline by the use of a catalyst containing platinum. Mrs. Mary C. Metcalf passed the Massachusetts bar exams in March, 1949. She has her own firm of consulting engineers, has been married for 10 years and has four children. All my wife can do is express astonishment over such an accomplishment.

In a year's time I have received two letters: One from Walt Blake says that Bill Burnet had a bad attack of polio but is recovering famously because of the Sister Kenny Treatment and his wonderful spirit. They have a second daughter born on September 21.

Al Woll writes as follows: "The family and I took a trip west over Christmas and New Year's Day. This was my first trip west of west St. Louis. Naturally, the thing to do when one goes traveling is to look up old friends and classmates and 'sponge' a good meal or two from them, even if it means taking along the family. The first free meal or two we received from the Harold H. Strauss' ['38]. Harold is with the Western Gear Works. The Gear Works design and manufacture gears for oil-field pumping units. Christmas Day the Wolls had their windfall. The Stan Zemanskys, XVI, invited us out to a real old-fashioned Christmas dinner. Yes, we had stuffed turkey, date-nut cakes, and even the flaming plum pudding in brandy sauce. It looks like the architect he married (Anne Alice Person '39 IV) knows how to make a home, let alone build one. Stan is still with the North American Aviation Corporation, but in the materials division. It seems that the Zemansky's have two turkey eatin' cowhands. One is called Hopalong Zemansky, and the other, Roy (Rogers) Zemansky. They can prove it by the garb they wear, even down to the leather chaps and the television programs to which they are glued. My daughter was 'Dale Evans' for the day. It came to pass that the Wolls had to leave and meet in Hollywood at a specified time. The only conveyance at hand was Zemansky's trusty four-wheeled steed. Into it piled the three Wolls and the four Zemanskys. Thus began my breath-taking ride in the wild and wooly west. Hopalong and Roy kept a machine-gun-like banging away with their pearl handled cap pistols through the rear window of the 'steed.' (Good thing tweren't real bullets or every varmint between Zemansky's Half-Quarter-Acre Ranch and Hollywood and Vine woulda bin ded'uns.) Down the Sunset Strip sped the 'Steed,' and on to Vine Street. As luck would have it, we were on the wrong side of the street. As the 'Steed' lurched a long arc to the left in a U turn, 'Sound Effects Annie' wailed a long siren-like moan of 'O-O-O-ooo.' Yup, no

ticket for Zemansky, and we kept our vittles, and the Wolls made it on time. Ah, for the complacent Midwest. Seems to me that M.I.T. should have a good rifle team; a real good la crosse team and a real rough and tumble field day around 1961 from what's coming up. On the way to Los Angeles I called Milt Lief, XVI, in St. Louis. Through a series of calls, I finally reached him out in the 'styx' where he is working at the plant. One of two things happened here. In moving from the downtown office, he has either been put to work or moved up another rung on the ladder. By way of Christmas cards I see where Bill Healey, XV, is now a New York State resident. I kept thinking that he was a dyed-in-the-wool New Englander. No mention was made of a change of jobs, so I presume that he is still with General Aniline and Film Corporation. Again by way of Christmas cards, I see Lou Pepperberg, VI, is now president of Inductance Corporation in Chicago. He was with Zenith Radio." Thanks, Al, for the interesting letter!

Mrs. Carolyn Mawdsley married Irving Tourtellot on March 3. In February, Frank E. Goddard, Jr., M.I.A.S., joined the Jet Propulsion Laboratory at California Institute of Technology as chief of the wind tunnel section. Edgar C. Rust, Jr., joined the James Hunter Machine Company as assistant to Frank B. Morrill. A. R. Graustein, Jr., was named director of Market Research of Lever Brothers Company. John R. Ferguson, Jr., is now assistant to the general superintendent at the South Chicago works of Carnegie-Illinois Steel Corporation.

Arthur R. Hunt and Wayne M. Pierce, Jr., owners of the Tey Manufacturing Corporation of Milford, Conn., have invented a way to make snow. Ski enthusiasts can be cheered by this after the past two winters with very little snow. Leonard A. Seder, chief quality control engineer of the Gillette Safety Razor Company, was the principal speaker at the Western Massachusetts Society for Quality Control recently, his subject being, "The Techniques for Process Trouble-shooting."—WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. WALTER T. BLAKE, *Assistant Secretary*, Research Products Development Division, Pillsbury Mills, Inc., Minneapolis, Minn.

## • 1939 •

We make our annual June plea for news as we go to press with only one news item! Roy Haworth was recently appointed manager of product development for the Carbide Alloys division of the Allegheny-Ludlum Steel Corporation. Formerly, Roy was employed by the Armour Research Foundation in Chicago. In his new position, he will be located in Detroit, Mich.

In comparing the length of our column with some of the other classes, it is a pretty poor showing for 1939—suggestions will be welcome.—STUART PAIGE, *General Secretary*, 701 Mill Plain Road, Fairfield, Conn. GEORGE BEESLEY, *Assistant Secretary*, Whitemore-Wright Company, Inc., 62 Alford Street, Charlestown 29, Mass.

From Leon Crane in Newtown Square, Pa., we hear of progress at the helicopter plant near Morton Station. He speaks of several interesting experiences; for instance, spending a week at Windsor Locks, Conn., getting his helicopter CAA rating with Bell Helicopters and learning about crop dusting by helicopters as done by the New England Helicopter Service; two weeks of active duty at Wright Field; flight testing a brand new helicopter and demonstrating it to prospective purchasers for arctic rescue work. There are plenty of experiences and laughs to be had at Piasecki and Leon seems to be enjoying them. There are three youngsters in the Crane family with only two old enough, according to Wilma Crane, to enjoy the rigors of the country and the spectacle of their father riding a polo pony.

From Bill Bowes we received a review of activities during the last nine years. Bill left M.I.T. and Course V with the rest of us and joined American Cyanamid's Stamford Research Laboratory as a research chemist. In 1943, he went on a field trip to Bridgeville, Pa., for 18 months. After that, he was with the Manhattan Project until December, 1945. Meanwhile, Bill attended night classes at the Polytechnic Institute of Brooklyn and earned an M.S. degree in Chemical Engineering. From January, 1946, to March, 1950, he worked as research chemist and chemical engineer in the basic nitrogen division of American Cyanamid. Bill was just appointed assistant plant manager of the Stamford Research Laboratories. The Bowes have two boys, ages six and two.—Dr. Leona Norman and Dr. Edward Zarsky were married in October. Leona is the M.I.T. representative, having finished her education at the Boston University School of Medicine. Ed is a Tufts product.

Commander Frank Menefee has recently reported for duty at the Fore River Yards as aide to the supervisor of building and inspector of ordnance. Frank, who is a graduate of the Course in Naval Construction and Engineering, specializes in hull designs and construction.—Every day we hear of the work of the 100-dollar-a-day consultant to the city of New York in its weathermaking efforts; that is, Wallace E. Howell, research meteorologist at the Blue Hill Meteorological Laboratory of Harvard University. Howell was recommended by Dr. Langmuir of General Electric and has agreed to undertake the experiment as another step in his study of cloud physics and ice formation. Howell, by the way, has served as consultant to the Air Corps in this field and is a member of the subcommittee on icing of the National Advisory Committee for Aeronautics. We wish him luck and favorable conditions in the work. It looks like an interesting six months. Frankly, we have never before received so many newspaper accounts on the activities of a '41 man.—STANLEY BACKER, *General Secretary*, 335A Harvard Street, Cambridge 39, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, Saddle Hill Farm, Hopkinton, Mass.

A wedding, an engagement, the movement of a radio engineer, the reappointment of an N.A.C.A. subcommitteeman, and a search for the ancient city of Tamna, home of the Queen of Sheba, make up the strange assortment of news this month. Let's look at it all in this order. April 22 was the wedding day for the former Alice Marie Dessert and Richard P. Welcher, both chemists with the American Cyanamid Company in Stamford, Conn. The ceremony was held in the Sacred Heart Church in East Providence, R.I., and a reception followed in the Old Crist Mill in honor of the newly wed couple.—The engagement of Emily Preissler and Edward P. Lesniewski is announced by the future bride's mother. Emily's home is in Woodside, L.I.; she graduated from Long Island University, and is currently teaching in a Seattle public school. Her future husband, who graduated from the Catholic University in Washington, D.C., studied meteorology at M.I.T. during the War. He is now a weatherman with the Northwest Airlines.

The reappointed National Advisory Committee for Aeronautics' subcommitteeman, John P. Longwell, is in charge of a combustion study being conducted for the Naval Bureau of Ordnance in the Esso Research Laboratories of the Standard Oil Development Company in Linden, N.J. This subgroup is charged with the responsibility of giving advice to, and reviewing the work done at N.A.C.A. and other installations dealing with combustion problems. Dr. Longwell did his undergraduate work at the University of California and qualified for his doctorate at M.I.T. in 1943.—The radio engineer on the move is William R. Thurston, Jr., who has been with the General Radio Corporation in Cambridge for several years. He was transferred earlier this year to the sales engineering department in the New York engineering office of the corporation.

Richard L. Bowen, Jr., is the man on the trail of the Queen of Sheba. When not exploring the Near East, Bowen is vice-president and research director of the Coated Textile Mills in Pawtucket, R.I. Currently, he is technical and engineering adviser in a team of 40 persons who are hoping to reach the site of the pre-Christian city, Tamna, in the protectorate of Aden. The expedition is sponsored by the American Foundation for the Study of Man and is financed by a grant from Congress together with private endowments. The location of the city is known, but reaching it by land is fraught with hardships, including considerable possible opposition from the local inhabitants of the area. The expedition has already reached the general area, which was in ancient times the nation of Sheba. This area by 2500 B.C. had attained an advanced culture. And although it is best known for its very famous Queen of a bygone age who visited and later tired of the court of King Solomon, it is a pivotal milestone in the development of modern civilization. Thus, it is thought to be the birthplace of the western alphabet, and perhaps the region where the camel was first domesticated as a pack animal. Moreover, it had

an extensive pottery industry and was on the ancient spice trade route between the Orient and the Middle East.—CLINTON C. KEMP, *General Secretary*, 29 Verlynn Avenue, Hamilton, Ohio.

## • 1944 (2-44) •

This month, I want to devote our notes to a letter from Bob Peck that I think is extremely important. Before I left Boston last summer, I asked Bob to look into the possibility of doing something about our 25-year reunion gift, and many of you will remember his preliminary report at our reunion last June. Since then, the Class Gift Committee has done much and deserves the heartiest of congratulations. Now it is our turn to do our part. Here is a chance to show our unity as a class, and I strongly urge that each of us do everything we can to put this plan over the top.

Bob's letter follows: "Early in June, all members of the Class will receive literature describing our approach to building up a class gift to be given to the Institute at our 25th reunion in 1969. It is our sincere belief that this approach is the best adapted to our needs. It is our strongest hope that all classmates will study the plan and become active participants by returning the post card indicating their desire. The plan and literature are the result of a considerable amount of work, Bill, and while I do not want to go into the details in this letter (they are completely and better described in the literature), I would like to tell you what has been done since you asked me to look into class gift possibilities.

"I formed a Working Committee last summer of Bob Bartz, Bob Breck, Mal Kispert, Al Madwed, Al Michaels, Dick Palme, Ken Rehler and Phil Whitaker. We talked with a large number of persons including Horace Ford, Don Severance '38 and Chick Kane '24 at the Institute, other class gift committees, bank and investment men and insurance men from companies, agencies and Massachusetts savings banks. There were two problems in raising this gift: First, arriving at \$100,000 with the broadest possible participation at the least cost per individual; second, finding a way to handle the endless details of checking lists, mailing literature, contacting classmates, receiving money and so on. Last October, after many meetings and much talk, we decided an insurance program to be the best answer.

"There are a great many considerations affecting our choice, but I think the major ones are: (1) The contribution per man is small, averaging \$17 per year per \$500 of insurance; (2) The number of classmates participating will, therefore, be large; (3) The insurance will be paid up in 1969 and the policy value is the basis of our gift; (4) A man, even though helping the class gift fund, receives something in return—insurance until 1969; (5) The clerical and administrative details (which we are not set up to handle) are taken over by the E. Lester Goodrich Agency, which also handles the M.I.T. pension plan and is closely tied to Institute affairs. In short, the plan combines a successful way



of reaching our goal with the least individual cost and effort. We have already written to 95 classmates and received 35 affirmative replies. Each of these 35 men has agreed to serve on our Class Gift Committee and each has taken out insurance—to a total figure of \$25,000. We can certainly reach our goal if each of our classmates does his best to maintain this rate.

"I hope, Bill, that you will mention this class gift plan in the June class notes, for during June all classmates will receive a full description of the plan, a letter of Institute approval from Horace Ford, and a post card to return to indicate participation. When we realize that, while tuition is \$800, the Institute now spends \$1,300 per student per year for education alone (entirely aside from research and government contracts); when we consider the possibility of such colleges as M.I.T. becoming dependent upon the government for aid; and when we remember the days and friends we had at Technology, I am sure that our Class will produce a unanimous response.

"I can say very sincerely that I believe this plan and the time I have given it entirely worthwhile. Many fellows have written to me asking for further information and giving me their views. I more than welcome such comments and hope that anyone who cares to will write to me in care of Johns-Manville Corporation, 49 Federal Street, Boston. In the meantime, Scotty, my best wishes to you and heartiest congratulations on your marriage."—WILLIAM B. SCOTT, *General Secretary*, 3916 Potomac, Dallas, Texas. MALCOLM G. KISPERT, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

## • 1946 (6-46, 9-46) •

The coming five-year reunion is the big news for the lads who came out of Technology in June and September of 1946, and our Class President, Dave Black, still solicits all suggestions and will welcome offers of aid.

Don and Mrs. Hurter broke into print recently when the Boston *Globe* took note of their antique auto-repairing activities. Don finds time, incidentally, to represent the Class on the Alumni Council and to act as general chairman for our 1951 reunion. Gene Pope, Jr., also made the newsprint again with a commendation on the efficient manner in which he is handling the big Italian-American New York newspaper, the *Il Progresso Italo-Americano*.

In Dan Cupid's department, Class Secretary Harry Augenblick, Jr., and Barbara Salomon of Washington were married on April 16. We appreciate the advance notice of this event forwarded to us by Mr. Clarke '21, even though June catches us before we make a report. Those rumors are flying about Jack Filbert, XIII, and Ethel Suhr of Flushing, N.Y. We haven't heard the date yet.

In the wanderer's column 'tis reported that Jim Vanderbeek, XVI, couldn't find enough cold in Wyoming so he went farther north to Calgary in Alberta, Canada. Lieutenant Commander Clarence Wright, XIII-A, has given Pearl Harbor back to the pineapples and re-introduced himself to the Virginia gentry down Falls Church

way. Another additional statistic in the greater Washington, D.C., census is Merwin Burman, XVI, formerly of the windy city, Chicago. Ensign Guy Wooten, XVI, after treating the air fields of the Deep South to the results of former V-12 training, is closer to the Mason-Dixon line at Chincoteague, Va. Vic de Mello Bachmann, I, well known to all 6- and 9-46 men around the Institute, is now with the Sao Paulo Tramway Light and Power Company in Sao Paulo, Brazil. Depending upon the winds of chance, Frank McCarthy, XIII, is now either close by Broadway at the Columbia University School of Journalism or caught by a Missouri dust storm out by the University of Missouri.—HARRY A. AUGENBLICK, JR., *General Secretary*, 301 South Ridgewood Road, South Orange, N.Y. JAMES W. CHURCH, *Assistant Secretary*, 2619 South 9th, Council Bluffs, Iowa.

## • 1947 •

Conscience-stricken classmates are a boon to people like me—occasionally they break down and write a letter; to wit, that received from Barry Brown some time ago. "Your recent column in *The Review* made me feel rather ashamed of myself, so I will let you in on the secret that I am still alive. I have been here in Niagara Falls since July, 1947, with the Hooker Electrochemical Company; first in the capacity of a study group engineer, and since November as technical foreman of the Fine Chemicals Department. The work is interesting, which makes up for the Falls, which are not. I am still single; although I have had several narrow escapes lately. I've seen very few members of our Class since I left the Institute. Watt Webb and Ed Kane are here in Niagara Falls; Ed works for the Ontario Paper Company, and Watt for Union Carbide and Carbon, electrometallurgical division. Ed has been married since last summer, but I believe you know that. Doubt very much whether I'll be able to get back to Boston in the near future; although I'd like very much to see all the new buildings and other improvements." Thanks very much, Barry, and let's hope you can at least make it out for Alumni Day. A big time is promised for all.

Had a very pleasant surprise some weeks ago when Bill Crawford unexpectedly dropped into the office for a chat. Bill was on vacation from the Chrysler Corporation, and this was his first trip back east since graduation. It appears that Bill got homesick for New England—an understandable feeling, indeed. Last June Bill completed the industrial training program given by Chrysler in Detroit; and, as a result of this postgraduate work, was awarded a master's degree in Automotive Engineering, which counts for much in the automotive world. He has since been engaged as a road-test engineer in the car performance lab. Driving has become almost second nature to him, and he thinks nothing of cruising along the highway at a sedate 80—which is O.K. in Michigan, but a little embarrassing in Massachusetts, particularly when the state policeman takes 20 miles to overtake you. Bill gave us quite a bit of interesting information on what to look for in buying a car.—In

February, I spent a very interesting week end with June and Arnold Judson in Providence. Arnold is with U. S. Rubber, but has not neglected his music, and played some of his latest compositions. Two of his works will be played by the Brown University Orchestra shortly. He is also inordinately proud of his wife, bragging to all within earshot of his all-A student in her last year at Pembroke.

Since last these notes appeared, we have had two dinner meetings of the executive committee of the Class, the results of which you will have by now been informed. At the first, only Norm Holland, Jim Phillips and myself were present. Walt Kisluk was in St. Johnsbury, Vt., on a short training course for his company, Fairbanks Morse. At the second, Jim was unfortunately ill with a cold, but Wally was there, a little stouter perhaps, but his old remarkable self. Needless to say, the evening was a lively affair. Professionally, Walt started with Phelps Dodge, and spent some time in the Yonkers, Ft. Wayne, and Elizabeth, N.J., plants of that company. In February of last year, he joined Fairbanks Morse for whom he is now a field engineer.

Tom Cheatham and wife returned from Norway in March. Tom had been teaching at the Institute for National Defense in Bergen, as we reported some months ago. Unsettled conditions were primarily responsible for Tom's return earlier than he had planned.—Three of our classmates have been promoted to the rank of assistant professor at M.I.T., effective in July: Don Harleman, Department of Civil and Sanitary Engineering; Charles Smith, Department of Mechanical Engineering; and Jim Polychrone, Department of Building Engineering and Construction.

Dick O'Donnell writes: "Doubt if I'll make the festivities this year due to business. I occasionally see or chat with such fellows as Dave Black '46, Herb Hansell '46, Bill Grant '48, Fred Howell '47, Jim Prigoff '47, George Katz '47, Bill Maley '48, Don Merriman '49 and Dick Morel '49, and thereby garner bits of information and/or gossip, but the scope is rather limited as all of the above are living in New York. I do regret, however, that as yet I have found it more or less impossible to attend more than one meeting of the M.I.T. Club of New York. I have very little to report on myself other than, as is the advocacy of a bachelor, I am vainly in pursuit of an honest buck as an application engineer with Ingersoll-Rand."

Art Schwartz dashed off a brief note: "My humblest apologies for not keeping in touch with you. For six months I was selling candy manufacturing machines for a firm in New York, but in March got this job as assistant plant manager with the Kleen-Stik Manufacturing Company in Newark. I've never worked so hard, but I love it. Also, got a three-year-old palomino colt last fall and have been spending most of my week ends with him. Even rode him in the Apple Blossom Festival Parade in Kingston, N.Y. He almost won the Queen prize!"

Jack Rizika came into the office some time ago and dropped off a copy of the *American Scientist* in which his article,

"A Philomathic Study of Rain," appears. Still haven't found out the definition of "philomathic," no *Webster's Unabridged* handy. Hal Brodsky has become general foreman of Departments R1 and R12 at the Fafnir Bearing Company plant in New Britain, Conn., and Lieutenant Colonel L. E. Cox has been assigned to duty in Bremerhaven, after serving as district assistant engineer commissioner in charge of the Departments of Highways and of Vehicles and Traffic in Washington.

Alfred Matter, who received his S.M. degree in Civil Engineering with our Class, spent a week end in Boston recently. Alfred joined the United Nations in May, 1948, and was working on international agreements on highway transport in the Transport and Communications Division. He is now with the International Bank for Reconstruction and Development in Washington, D.C. (since April, 1950) assigned to the technical section dealing with the engineering feasibility of projects proposed to the Bank by various governmental agencies. The Bank's function is to finance loans for the purchase of imported materials for construction and development of member nations. Alfred's home is in Bern, Switzerland, and he attended the Federal Institute of Technology in Zurich before coming to M.I.T. for graduate study.

Engagements and weddings still continue to provide a good portion of the interest in this column. Several betrothals have been announced within the last few months. Jerry Hahn to Claire Bloom of Pittsburgh, Pa. George Sawutz to Jeanne Talbot of Glen Ridge, N.J. George, who is working for Westinghouse, is now attending Newark College of Engineering. Hilmi Arslan to Ruth Howe of Brookline. Greta Donaldson to Robert S. Postle, Jr., of London, Ohio. Greta is with Bell Aircraft in Buffalo. There are three wed-

dings to report. Roger Williams married Anna Marie Given of New York; Herb Waxler wed Betty Brown of Newton; and Bob Schumacher took as his bride, Margaret C. Stocks of Chicago, Ill. Bob, in his last year at Harvard Law School, will be living in Belmont.—CLAUDE W. BRENNER, *General Secretary*, Room 23-130, M.I.T., Cambridge 39, Mass.

#### • 1949 •

An after-dinner bull session with Paul Watkins and a letter from John Knowlton tossed a little light on the whereabouts of the Course X '49 men. John completed the Student Engineering Training Program and is now assigned to the Technical Service division of Esso Standard Oil, Linden, N. J. His letter goes on to say he "likes the work a lot—never a dull moment—with a great many Alumni down here, just like the old days." Dean Humphrey is working for the Solvent Chemical Company in Malden. Ross Watson was married last June to Nella L. Wilson of Franklin, Mass., and is now in Wilmington, Del., with the Development Station of Hercules Powder. Eugene Woodward is with the Kerr Magee Oil Company and living in Oklahoma City. Paul Sawyer is with John Hancock studying for an actuarial position.

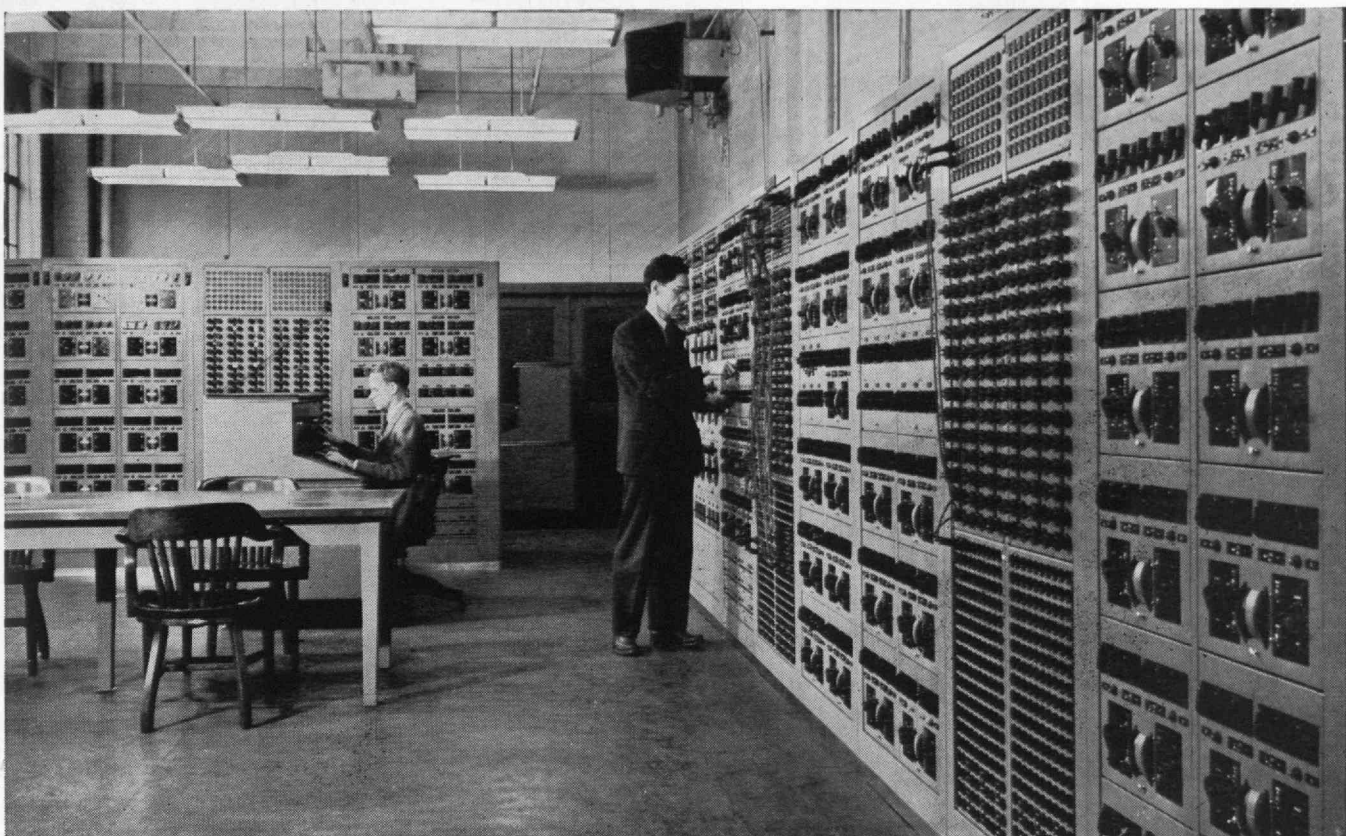
Wallace Douglas, industrial engineer with Worcester Street Railway Company, discussed in a talk, "How We Do It," the methods used by a modern business to help personnel develop latent talent. The talk was presented before the Worcester chapter, National Association of Cost Accountants. Victor Lim conducted a film forum on "Important Factors of the Philippines Today" at the Boston Public Library. Mr. Lim is now attending the Harvard Business School. Jack Westbrook reports "presently doing metallurgical research for G. E. at their new Knolls Lab-

oratory near Schenectady. Family now consists of Nicholas (two years) and Kathryn (two months)."

ENGAGEMENTS: Philip Bloecher to Virginia Feltham of Springfield, Mass. Paul Osborn, Jr., to Mary Norton of Easton, Pa. Italo Servi to Caroline Bordetsky of Roxbury, Mass. Italo is still at Technology and expects to complete his work for a doctorate sometime next winter. Joseph Stern to Phyllis Swett of Belmont, Mass. Donald Roy Sprague to Jeannette Morgance of Bangor, Maine. Don is a hydraulic engineer in Sacramento, Calif. Frederick Beutler to Abigail Caplan of Boston, Mass. E. Daniel Boston to Lois Deputy of Plainfield, N.J. He is with Standard Oil Development of Baton Rouge, La. Theodore Foster to Thelma Detweiler of Wilmington, Mass. George Piness to Edith Lamm of Forest Hills, N.Y. Joseph Sableski to Eleanor Kambour of Barton, Va. Frederick Schneider to Nancy Harris of Babson Park, Mass. Arlie Sterling to Judith Anderson of Wellesley Hills, Mass. Edward Stoessel to Janet Pray of Laconia, N.H. Joseph Vitka to Elizabeth Burke of Beverly, Mass. Joe is with Sylvania Electric Products, Inc., in Salem, Mass.

WEDDINGS: Van Tuyl Boughton to Elizabeth Renick on March 18 in Plainfield, N.J. Donald Hansen to Muriel Hammonds on March 3 in Middlebury, Conn. Don is with Research Products Company, Danbury, Conn. John P. Regan to Alice Bayliss on February 24 in New York. Martin Santa was an usher. John is with the American Cyanamid Company, Linden, N.J. Horton Shaw to Martha Ware on March 4 in Medford, Mass. He is with the Marine division of Cities Service Oil Company, New York.—CHARLES WILLETT HOLZWARTH, *Secretary*, Morris C-36, Harvard Business School, Soldiers Field, Boston 63, Mass.





## New Type Computer *Solves Problems without Arithmetic*

What will be the performance of a jet plane in flight when subjected to various disturbances? That's a problem to tax the most brilliant mathematician. Yet here comes a machine . . . that does the work of a "brain cell" . . . that's ready, willing and able to solve the problem, quickly . . . accurately.

This newly developed "brain cell", called the "Anacom", substitutes voltages and currents for numbers that are fed into digital-type computers . . . has solved 43 various types of engineering problems in addition to mathematical problems not arising directly from physical systems.

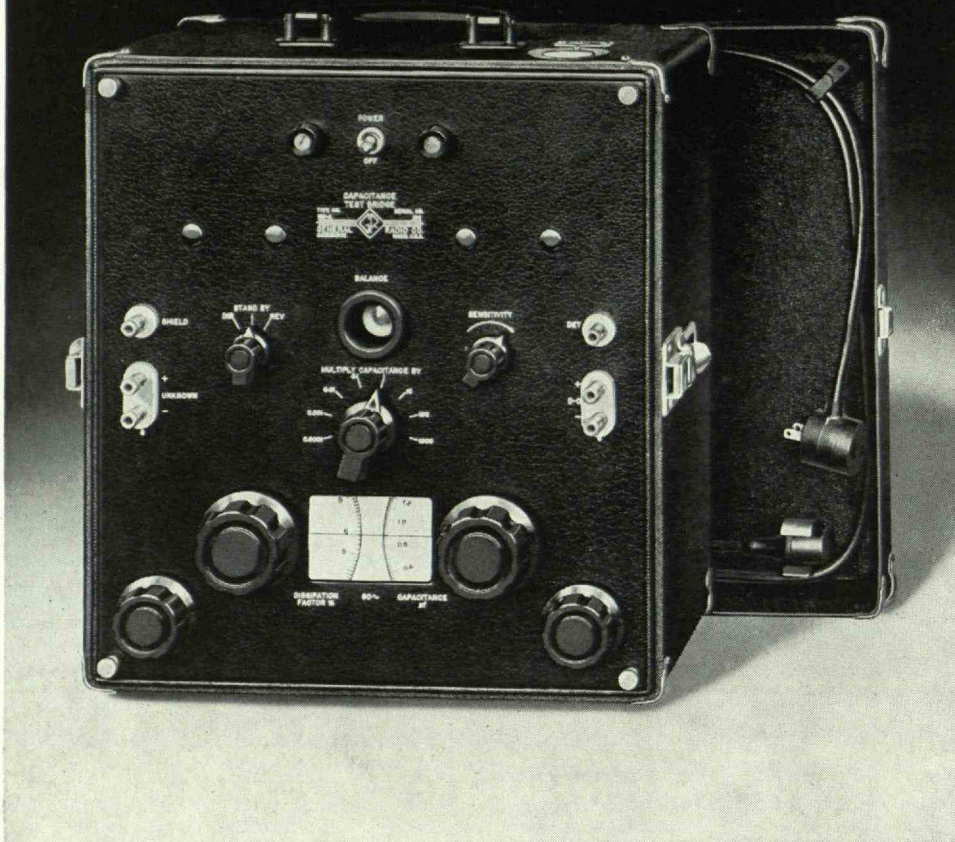
In operation, the "Anacom" produces an electrical "imitation" of mechanical forces. Resulting voltages representing stress, motion and similar factors appear as lines on an oscilloscope screen. These lines can be measured accurately and translated to terms of the product under study.

The "Anacom" is one of the more complex developments of Westinghouse to facilitate research, product developments and quality control. Its development is typical of the depth to which Westinghouse will probe in its constant endeavor to look ahead . . . to keep ahead . . . to live up to its promise . . .

*You can be **SURE**..if it's* **Westinghouse**

G-10099

# A RANGE OF TEN BILLION TO ONE



## WITH THIS CAPACITANCE TEST BRIDGE

**D**ESIGNED as an improvement on the popular Types 740-B and 740-BG Capacitance Test Bridges, this new G-R Type 1611-A Bridge is an important advance in increased accuracy, sensitivity and convenience in operation.

This bridge measures capacitance from  $1\mu\text{f}$  to  $11,000\mu\text{f}$  with an accuracy of  $\pm (1\% + 1\mu\text{f})$  over the entire range. Among its many features are:

- **CAPACITANCE & DISSIPATION-FACTOR DIALS** direct-reading through a single window . . . dials approximately logarithmic.
- **UNIQUE ZERO-COMPENSATING CIRCUIT** requiring no "zero" corrections for accurate determinations of capacitance and dissipation factor even at lowest bridge values.
- **HIGH SENSITIVITY** . . . capacitances between 100 and  $11,000\mu\text{f}$  can be balanced to a precision of at least 0.1%.
- **EXCELLENT DISSIPATION-FACTOR ACCURACY** of  $\pm (2\%$  of dial reading plus 0.05% dissipation factor) over entire range of 0 to 60% (at 60 cycles).
- **IMPROVED DETECTION CIRCUIT** with single-stage amplifier and electron-ray tube as visual null indicator . . . circuit designed to be very sensitive at or near balance and insensitive off balance

- **POLARIZING VOLTAGE CAN BE USED** for external connection up to 500 volts d.c. One terminal grounded so that a-c operated power supply with grounded output can be used.
- **UNIFORM POWER DELIVERED TO BRIDGE** . . . four separate sources of proper impedance and voltage, each providing maximum safe power to bridge, automatically selected by multiplier ratio switch.
- **ADJUSTABLE LIGHT SHIELDING** by means of slotted cylindrical light shield around indicator tube . . . adjustable for different external light conditions.

This new bridge is very useful in the power industry for measurements of dissipation factor on bushings and insulators and electrical insulation. For the measurement of dissipation factor and dielectric constant of both solid and liquid dielectric materials in chemical and plastic laboratory this bridge provides a highly accurate, sensitive and convenient tool.

TYPE 1611-A CAPACITANCE TEST BRIDGE . . \$395.00



# GENERAL RADIO COMPANY

Cambridge 39,  
Massachusetts

90 West St., New York 6 920 S. Michigan Ave., Chicago 5 1000 N. Seward St., Los Angeles 38